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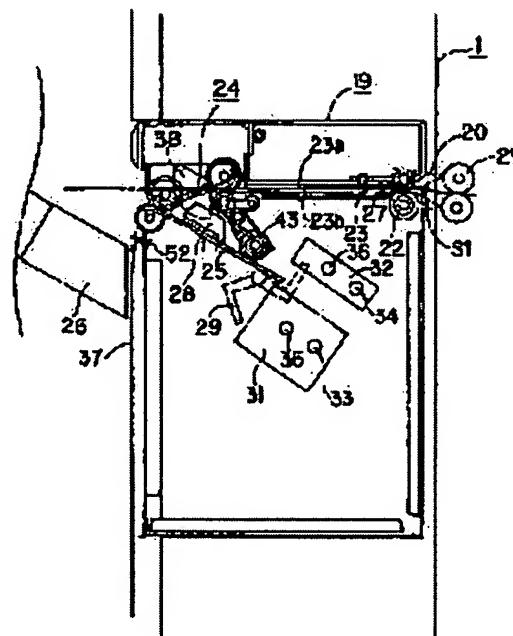
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(54) SHEET MATERIAL PROCESSOR AND IMAGE FORMING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a sheet material processor and an image forming device that save space and reduce cost while improving productivity.

SOLUTION: When a trailing end of a sheet material is fed over a given stroke past an inlet feed roller pair 22, the sheet material is fed upstream and the trailing end of the sheet material in switchback motion is fed to a butt portion 23c of a feed guide pair 23, whereat a sheet material holding arm 27 holds the sheet material to keep the sheet material on standby. The held sheet material is stacked in overlap between feed guides 23a and 23b and a downstream postprocessing tray 25 or a sheet material bundle stacked thereon.



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CLAIMS

[Claim(s)]

[Claim 1] The web-material processor characterized by preparing the web-material attaching part which can two or more sheet hold a web material in said conveyance path in the web-material processor equipped with a web-material sending means to send a web material into the interior of equipment, and the conveyance path where the web material sent in by this web-material sending means is conveyed.

[Claim 2] Said web-material attaching part is a web-material processor according to claim 1 characterized by being prepared in the gravity direction lower part rather than the web-material conveyance side sent in by said web-material sending means.

[Claim 3] The web-material conveyance means which is formed in said conveyance path downstream and can change the conveyance direction of a web material to the downstream and the upstream, After the back end of the web material conveyed escapes from said web-material sending means, by changing the conveyance direction to the upstream by said web-material conveyance means The web-material processor according to claim 1 or 2 characterized by pinching the web material which turned the inside of said conveyance path to the upstream, and was conveyed, and having a pinching means to hold a web material to said web-material attaching part.

[Claim 4] The web-material processor according to claim 3 characterized by being set up so that the force which pinches a web material with said pinching means may become large rather than the conveyance force of making a web material conveying in the direction of a lower stream of a river with said web-material conveyance means, while holding a web material after the tip of a web material has exceeded said web-material conveyance means in holding a web material by said web-material attaching part.

[Claim 5] An after-treatment means to perform after treatment to the web material conveyed by said conveyance path, The 1st web-material loading section which loads a web material in order to process to a web material with this after-treatment means, and the web material after processing was performed by said after-treatment means, Or the 2nd web-material loading section loading the web material which does not process with this after-treatment means, The web-material processor of any one publication of claim 1-4 characterized by having the web-material bundle conveyance device in which the web-material bundle loaded into said 1st web-material loading section is conveyed in said 2nd web-material loading section.

[Claim 6] While said web-material bundle conveyance device can prepare in coincidence the web material held at the web-material bundle loaded into said 1st web-material loading section, and said web-material attaching part possible [conveyance] It conveys so that the web-material bundle loaded into said 1st web-material loading section may precede rather than the web material held at said web-material attaching part, in conveying these to coincidence. It is the web-material processor according to claim 5 characterized by controlling said web-material bundle conveyance device to convey the web material currently held at said web-material attaching part in said 1st web-material loading section after making said web-material bundle load into said 2nd loading section.

[Claim 7] The web-material processor according to claim 5 or 6 characterized by to have the adjustment criteria member which dashes and adjusts the back end of the web material conveyed by the upstream with said web-material conveyance means, the interior material of a back end proposal which shows the back end of a web material to this adjustment criteria member, and the web-material presser-foot

member which presses down the web-material bundle loaded into the sheet adjusted by said adjustment criteria member and said 1st web-material loading section.

[Claim 8] The web-material processor according to claim 6 or 7 characterized by these web materials being conveyed by coincidence according to this web-material bundle conveyance device by setting both the web material loaded into said 1st web-material loading section, and the web material held at said web-material attaching part in the condition that the tip of these web materials was projected at said 2nd web-material loading section side exceeding said web-material bundle conveyance device.

[Claim 9] The direction of the amount of protrusions by the side of said 2nd web-material loading section of the web material loaded into said 1st web-material loading section By being set up so that it may become larger than the amount of protrusions by the side of said 2nd web-material loading section of the web material held at said web-material attaching part The web-material processor according to claim 8 characterized by being conveyed so that the web-material bundle loaded into said 1st web-material loading section may precede rather than the web material held at said web-material attaching part.

[Claim 10] Said pinching member is the web-material processor of any one publication of claim 3-9 characterized by being the arm member which is prepared in said conveyance path and also has the function which guides the conveyance direction of a web material, and which is controlled free [rocking].

[Claim 11] Said pinching member is the web-material processor of any one publication of claim 3-9 characterized by being the roller formed in said conveyance path.

[Claim 12] Said after-treatment means is the web-material processor of any one publication of claim 5-11 characterized by the thing of the punch means to perform punch processing to a stapler means to carry out ***** to a web-material bundle, a bookbinding-ized means to bookbinding-ize a web-material bundle, and a web material included for any one at least.

[Claim 13] the condition that this image formation equipment was equipped while being constituted free [attachment and detachment] to the image formation equipment which forms an image on a web material -- this image formation equipment -- the web-material processor of any one publication of claim 1-12 characterized by sending in in equipment the web material by which image formation was carried out with said web-material sending means, and performing after treatment to this web material.

[Claim 14] Image formation equipment characterized by having an image formation means to form an image on the web material conveyed, and the web-material processor of any one publication of claim 1-12 which performs after treatment to the web material which performed image formation with this image formation means.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is constituted free [attachment and detachment] to image formation equipments, such as a copying machine and a printer, and relates to the web-material processor which performs after treatment of a web material [finishing / image formation] or the web-material processor which it has in one to image formation equipment, and image formation equipment equipped with the web-material processor.

[0002]

[Description of the Prior Art] In recent years, web-material processors, such as a ***** sorter, are developed in the web material [finishing / image formation] as an option of image formation equipments, such as an electrophotography copying machine and a laser beam printer.

[0003] And not only a sort function but a certain amount of web material is loaded and adjusted, or the stapler which carries out needle binding is formed and it is becoming various with it being as creating a web-material bundle **** at this kind of web-material processor.

[0004] In the web-material processor equipped with the stapler which carries out needle binding, after passing the conveyance way formed in the interior of a body in the web material conveyed in the body of a web-material processor and loading the tray for after treatment, it is made to perform binding actuation.

[0005] By the way, when filing a web-material bundle, the stapler which is a binding means is moved and it is made to perform one-place binding or two or more binding (usually two-place binding).

[0006] Here, while performing binding actuation, the web material of the following job cannot be loaded into the tray for after treatment. Therefore, having opened between the papers between jobs was common between binding actuation.

[0007] However, if it opens in this way between the papers between jobs, pro DAKUTIBI tea will fall. It is indicated by the JP,9-48545,A public presentation official report as a technique of preventing the fall of such pro DAKUTIBI tea.

[0008] This technique is explained with reference to drawing 2 . Drawing 2 is the typical sectional view of the web-material processor concerning the conventional technique.

[0009] With this equipment, the web material was twisted around the rotating buffer roller, and the buffer roller path which makes conveyance to an after-treatment tray stand by is prepared in the conveyance path in the middle of conveying a web material on an after-treatment tray.

[0010] After storing the web material conveyed from image formation equipment in the buffer roller path by such configuration, and a front web-material bundle's ending binding actuation on an after-treatment tray and conveying from an after-treatment tray, he was trying to prevent the fall of pro DAKUTIBI tea by making it make the tray for after treatment convey the web-material bundle currently stored in the buffer roller.

[0011]

[Problem(s) to be Solved by the Invention] However, in the case of the web-material processor concerning the above conventional techniques, the following problems had arisen.

[0012] In order to make conveyance to an after-treatment tray stand by, when it considers as the configuration which prepares a buffer roller path, in order to have a buffer roller path, a big

configuration will be needed, and a tooth space will be taken. Therefore, while the magnitude of the web-material processor itself will become large, there was a problem that cost will also start, in connection with it.

[0013] The place which it was made in order that this invention might solve the technical problem of the above-mentioned conventional technique, and is made into the purpose is to offer a space-saving and low cost web-material processor and image formation equipment, aiming at improvement in pro DAKUTIBI tea.

[0014]

[Means for Solving the Problem] If it is in this invention in order to attain the above-mentioned purpose, in the web-material processor equipped with a web-material sending means to send a web material into the interior of equipment, and the conveyance path where the web material sent in by this web-material sending means is conveyed, it is characterized by preparing the web-material attaching part which can two or more sheet hold a web material in said conveyance path.

[0015] Said web-material attaching part is characterized by being prepared in the gravity direction lower part rather than the web-material conveyance side sent in by said web-material sending means.

[0016] It is characterized by pinching the web material which turned the inside of said conveyance path to the upstream, and was conveyed, and having a pinching means to hold a web material to said web-material attaching part by being prepared in said conveyance path downstream, and changing the conveyance direction to the upstream by said web-material conveyance means, after the web-material conveyance means which can change the conveyance direction of a web material to the downstream and the upstream, and the back end of the web material conveyed escape from said web-material sending means.

[0017] While holding a web material after the tip of a web material has exceeded said web-material conveyance means in holding a web material by said web-material attaching part, it is characterized by being set up so that the direction of the force which pinches a web material with said pinching means may become large rather than the conveyance force of making a web material conveying in the direction of a lower stream of a river with said web-material conveyance means.

[0018] An after-treatment means to perform after treatment to the web material conveyed by said conveyance path, The 1st web-material loading section which loads a web material in order to process to a web material with said after-treatment means, and the web material after processing was performed by said after-treatment means, Or it is characterized by having the 2nd web-material loading section loading the web material which does not process with this after-treatment means, and the web-material bundle conveyance device in which the web-material bundle loaded into said 1st web-material loading section is conveyed in said 2nd web-material loading section.

[0019] While said web-material bundle conveyance device can prepare in coincidence the web material held at the web-material bundle loaded into said 1st web-material loading section, and said web-material attaching part possible [conveyance] It conveys so that the web-material bundle loaded into said 1st web-material loading section may precede rather than the web material held at said web-material attaching part, in conveying these to coincidence. After making said web-material bundle load into said 2nd loading section, it is characterized by controlling said web-material bundle conveyance device so that the web material currently held at said web-material attaching part may be conveyed in said 1st web-material loading section.

[0020] It is characterized by having the adjustment criteria member which dashes and adjusts the back end of the web material conveyed by the upstream with said web-material conveyance means, the interior material of a back end proposal which shows the back end of a web material to this adjustment criteria member, and the web-material presser-foot member which presses down the web-material bundle loaded into the sheet adjusted by said adjustment criteria member and said 1st web-material loading section.

[0021] Both the web material loaded into said 1st web-material loading section and the web material held at said web-material attaching part are characterized by these web materials being conveyed by coincidence according to this web-material bundle conveyance device by setting in the condition that the tip of these web materials was projected at said 2nd web-material loading section side exceeding said web-material bundle conveyance device.

[0022] It is characterized by being conveyed so that the web-material bundle loaded into said 1st web-material loading section may precede rather than the web material held at said web-material attaching part by being set up so that the direction of the amount of protrusions by the side of said 2nd web-material loading section of the web material loaded into said 1st web-material loading section may become larger than the amount of protrusions by the side of said 2nd web-material loading section of the web material held at said web-material attaching part.

[0023] Said pinching member is characterized by being the arm member which is prepared in said conveyance path and also has the function which guides the conveyance direction of a web material and which is controlled free [rocking].

[0024] Said pinching member is characterized by being the roller formed in said conveyance path.

[0025] Said after-treatment means is characterized by the thing of the punch means to perform punch processing to a stapler means to carry out ***** to a web-material bundle, a bookbinding-sized means to bookbinding-ize a web-material bundle, and a web material included for any one at least.

[0026] the condition that this image formation equipment was equipped while being constituted free [attachment and detachment] to the image formation equipment which forms an image on a web material -- this image formation equipment -- the web material by which image formation was carried out is sent in in equipment with said web-material sending means, and it is characterized by performing after treatment to this web material.

[0027] Moreover, if it is in the image formation equipment of this invention, it is characterized by having an image formation means to form an image on the web material conveyed, and the above-mentioned web-material processor which performs after treatment to the web material which performed image formation with this image formation means.

[0028]

[Embodiment of the Invention] With reference to a drawing, the gestalt of suitable implementation of this invention is explained in detail in instantiation below. However, the dimension of the component part indicated by the gestalt of this operation, the quality of the material, a configuration, its relative configuration, etc. are not the things of those meanings limited to seeing about the range of this invention, as long as there is no specific publication especially.

[0029] (Gestalt of the 1st operation) With reference to drawing 1 , drawing 3 - drawing 11 , and drawing 13 , the web-material processor and image formation equipment concerning the gestalt of operation of the 1st of this invention are explained.

[0030] In addition, the case where it is option-equipment with which the web-material processor consisted of explanation of the gestalt of this operation free [attachment and detachment] to image formation equipment as independent equipment is explained to an example. However, although it cannot be overemphasized that it is applied also when preparing for image formation equipment in one, since especially a functionally different thing from the case of the web-material processor explained below does not have the web-material processor of this invention, the explanation is omitted.

[0031] Drawing 1 is the typical sectional view showing the condition of having been equipped with the web-material processor to image formation equipment. In addition, in the example of illustration, image formation equipment is a copying machine and a web-material processor is a finisher.

[0032] First, the body of image formation equipment is explained.

[0033] (Image formation equipment) The body 1 of image formation equipment is equipped with the manuscript feed gear 2.

[0034] A manuscript is laid in the manuscript installation section 3, carries out sequential separation one sheet at a time by the feed section 4, and is supplied. then, a resist roller pair -- 5 stops and a skew is corrected by forming a loop formation. Then, it passes along the introductory pass 6 and the image formed in the manuscript front face is read by passing a reading station 7. The manuscript which passed the reading station 7 passes along the discharge pass 8, and is discharged on the discharge tray 9.

[0035] moreover, in reading front flesh-side both sides, it carries out as mentioned above first because reading of a front face passes a reading station 7 -- having -- the after that and discharge pass 8 -- a passage -- a reversal roller pair -- the condition of having carried out front flesh-side reversal by 10 -- again -- a resist roller pair -- it is sent to 5.

[0036] and surface reading -- the same -- a resist roller pair -- a skew sets right by 5 -- having -- the

introductory pass 6 -- a passage -- a reading station 7 -- a front face (it is a rear face at this time) -- forming -- having had -- an image -- reading -- having . And it passes along the discharge pass 8 and is discharged to the discharge tray 9.

[0037] The reflected light obtained by on the other hand irradiating light according to an illumination system 11 to the manuscript image which passes a reading station 7 is led to an optical element 13 (CCD or other components) by the mirror 12, and image data is obtained. And the laser light based on this image data is irradiated at the photo conductor drum 14, and a latent image is formed.

[0038] However, although especially illustration is not carried out, it can also constitute so that the reflected light may be irradiated at the direct photo conductor drum 14 and a latent image may be formed by the above-mentioned mirror 12.

[0039] A toner image is formed with the toner with which the latent image formed in the photo conductor drum 14 was supplied from the toner feeder which is not illustrated further.

[0040] 15 is a cassette which holds record media, such as paper or plastic film. It is supplied to the location where a record medium counters with the photo conductor drum 14 from a cassette 15 according to a record signal, and the toner image formed in the photo conductor drum 14 by imprint equipment 16 is imprinted on a record medium. And the record medium with which the toner image was imprinted is sent to an anchorage device 17, and it is fixed to it.

[0041] When forming an image in both sides of a record medium, by the anchorage device 17, the record medium with which it was fixed to the image of one side is again sent between the photo conductor drum 14 and imprint equipment 16 through the double-sided pass 18 prepared in the downstream of an anchorage device 17, and the NA image for a web material is formed in a rear face. And it is fixed to a toner image with an anchorage device 17, and is discharged outside (finisher 19 side).

[0042] (Web-material processor) A finisher 19 is explained with reference to drawing 3 . Drawing 3 is the typical sectional view of a web-material processor (finisher).

[0043] 19 is a finisher as a web-material processor, and is engaged and (wearing) used for the body 1 of image formation equipment.

[0044] 20 -- an inlet-port guide pair -- it is -- the delivery roller pair of the body 1 of image formation equipment -- it shows reception and a finisher 19 to the web material discharged from 21. S1 is a web-material detection sensor, and detects the web material which has advanced into the finisher 19.

[0045] 22 is an inlet-port conveyance roller pair as a web-material sending means which **** and conveys a web material, and sends a web material into the interior of equipment. 23a and 23b -- a conveyance guide pair -- it is -- an inlet-port conveyance roller pair -- the web material conveyed from 22 is guided and the conveyance path is formed.

[0046] Moreover, although conveyance guide pair 23a and 23b are explained in detail later, it serves also as the web-material loading function to make a web material stand by. In other words, the web-material attaching part which can two or more sheet hold a web material is prepared in the conveyance path.

[0047] Although it is behind detailed also here and 24 is explained, it is a conveyance unit as a web-material bundle conveyance device which has the function to convey a web material or a web-material bundle from conveyance guide pair 23a and 23b on the after-treatment tray 25 as the 1st web-material loading section, and the function conveyed on the loading tray 26 as the 2nd web-material loading section from the after-treatment tray 25.

[0048] Back end dropping [38] for making the back end of the web material conveyed from conveyance guide pair 23a and 23b install in the after-treatment tray 25 certainly near the conveyance unit 24 is formed.

[0049] moreover, the interior of conveyance guide pair 23a and 23b -- setting -- an inlet-port conveyance roller pair -- in order to make the web material conveyed from the body 1 of image formation equipment stand by to conveyance guide pair 23a and 23b near 22 before being conveyed by the after-treatment tray 25, the web-material maintenance arm 27 as a pinching member for ****(ing) and holding a web material is formed.

[0050] This web-material maintenance arm 27 serves as the function to guide the back end, and the function to hold a web material, and is controlled free [rocking].

[0051] 28 is an adjustment plate which constitutes an adjustment means, it guides the both ends of the web material discharged by the after-treatment tray 25, carries out ***** adjustment, and is arranged at the crosswise both sides which intersect perpendicularly with the conveyance direction of the web material discharged, respectively.

[0052] 29 is a stopper, is discharged by the after-treatment tray 25 and catches the back end of the web material sent in with the drawing-in roller 43.

[0053] Here, with the gestalt of this operation, the case of the stapler device (stapler means) in which ***** is carried out to a web-material bundle is explained as an after-treatment function (after-treatment means) of a web material.

[0054] However, as an after-treatment function, it cannot limit to this and after-treatment devices, such as a case of the bookbinding-ized function (bookbinding-ized means) which sizes in a web-material bundle, for example, binds a book, and a punch function (punch means) which punches to a web material, can also be applied.

[0055] In the stapler device in the gestalt of this operation, it has the upper stapler 32 and has the bending section which bends the needle struck by this upper stapler 32 from the bottom stapler 31.

[0056] The bottom stapler 31 is constituted so that it may rock centering on a shaft 33, and the upper stapler 32 is constituted so that it may rock centering on a shaft 34.

[0057] Moreover, the bottom stapler 31 and the upper stapler 32 are respectively constituted movable in shafts 33 and 34 in the thrust direction (cross direction which intersects perpendicularly with the web-material conveyance direction).

[0058] The bottom stapler 31 has the screw section which engages with the screw shaft 35 which has a spiral screw slot on a periphery, and is constituted by rotation of a screw shaft 35 movable in the thrust direction.

[0059] The upper stapler 32 has the screw section which engages with the screw shaft 36 which has a spiral screw slot on a periphery, and is constituted by rotation of a screw shaft 36 movable in the thrust direction.

[0060] In addition, it connects with the drive motor which is not illustrated, respectively through a gear etc., and the drive is given to screw shafts 35 and 36.

[0061] when the web material after after treatment, a web-material bundle, or after treatment is unnecessary, after treatment should do 26 -- the loading tray for loading the web material which is not -- it is -- a perpendicular direction -- being movable (rise and fall being possible) -- it is constituted.

[0062] S2 is a space detection sensor and detects the maximum top face of the web material on the loading tray 26.

[0063] It is the back end guide which consisted of perpendicular fields, and 37 guides the back end of the web material on the abbreviation loading tray 26 which moves perpendicularly.

[0064] Next, the configuration of a web-material standby device for making the web-material attaching part in the interior of a finisher's 19 conveyance guide pair 23a and 23b (interior of a conveyance path) and a web material **** and stand by and the conveyance condition of the web material in that case are explained in detail using drawing 4 (a), (b), and drawing 5 (c) and (d).

[0065] first, a discharge roller pair -- a web material is conveyed from 21. if the web-material detection sensor S1 detects this web material -- M3 motor -- driving -- an inlet-port conveyance roller pair -- 22 and roller 24a is rotated and a web material is conveyed in the direction of a lower stream of a river.

Here, roller 24a is the web-material conveyance means which can change the conveyance direction of a web material to the upstream and the downstream.

[0066] the back end of a web material -- an inlet-port conveyance roller pair -- 22 is passed, if specified quantity "A points of drawing 4 (b)" conveyance is carried out, the drive of M3 motor will be stopped, then the drive of M3 motor will be reversed, and this web material will be conveyed in the direction (the direction of the upstream) contrary to the conveyance direction which was being conveyed until now.

[0067] Moreover, it makes the drawing 4 (b) arrow-head above rock the web-material maintenance arm 27 energized with the spring 49 to it and coincidence in the drawing 4 (a) continuous-line location by applying excitation to a solenoid 48 (in direction which opens a tip).

[0068] and the back end (in this case, upstream tip) of the web material which switchbacks -- a conveyance guide pair -- 23 sticks and it sends in to reliance section 23c.

[0069] Then, excitation of a solenoid 48 is canceled, a web material can be held and a web material can be made to stand by by returning the web-material maintenance arm 27 in the direction of drawing 5 Nakashita.

[0070] thus, an inlet-port conveyance roller pair -- a web material can be held down [side / of the web material by 22 / conveyance] the gravity direction.

[0071] At this time, the web material currently held meets on the web-material bundle currently loaded into the conveyance guides 23a and 23b and the after-treatment tray 25 of that lower stream of a river, or there, and is loaded ranging over both.

[0072] Next, what the web material of two or more sheets is stood by and loaded for by performing actuation with the same said of the web material conveyed from the body 1 of image formation equipment (three-sheet loading is performed with the gestalt of this operation) is possible.

[0073] Here, if conveyance guide pair 23a tends to be carried in to a degree and you are going to make it carry in a web material to 23b when there is a web material which has already held and stood by, as shown in drawing 5 (d), roller 24a of the conveyance unit 24 will rotate in the direction which is going to draw out the web material in the condition of holding with the web-material maintenance arm 27.

Therefore, this conveyance force that it is going to draw out is reduced by using roller 24a as a sponge roller. However, roller 24a should just be not only a sponge roller but a low conveyance member (elastic low friction member). That is, it has set up so that the direction of the force which pinches a web material by the web-material maintenance arm 27 rather than the conveyance force of conveying a web material in the direction of a lower stream of a river by roller 24a may become large.

[0074] A web material can be held making roller 24a pinch a web material by doing in this way.

Therefore, since a web material can be held shortening distance of a conveyance path, a web material can be stood by in few tooth spaces, and, moreover, it is not necessary to interrupt conveyance of a web material.

[0075] next, a web material or a web-material bundle -- a conveyance guide pair -- the configuration of the conveyance unit 24 which has the function conveyed on the after-treatment tray 25 from 23 and the function conveyed on the loading tray 26 from the after-treatment tray 25, and the web-material conveyance condition in that case are explained in detail using drawing 6 (a), (b), drawing 7 (c) and (d), drawing 8 (e) and (f), drawing 9 and drawing 10 (a), and (b).

[0076] First, in order to make needle binding the after-treatment tray 25, convention number-of-sheets loading of the request of a web-material bundle is carried out (drawing 6 R> 6 (a)).

[0077] And interruption of a web material is not performed so that pro DAKUTIBI tea may not be reduced. That is, the web material conveyed from image formation equipment is held in the condition of having made the above-mentioned web-material standby device loading on the web-material bundle loaded into conveyance guide pair 23a, 23b, and the after-treatment tray 25, and conveyance to an after-treatment tray is made to stand by.

[0078] With the web-material processor in the gestalt of this operation, the staple actuation to the web-material bundle currently loaded on the after-treatment tray 25 can be finished by making the web material of three sheets stand by.

[0079] After web-material standby actuation of three sheets is completed, the drive of M1 motor shown in drawing 9 R> 9 begins. In addition, drawing 9 is the drive-system perspective view of the conveyance unit 24.

[0080] By the drive of M1 motor, by the configuration using a well-known spring clutch, the conveyance unit 24 makes shaft 24b the center of rotation, and it falls in the direction of an arrow head of drawing 6 (b), and is crowded. And sponge roller 24d which descends in connection with it is contacted on the web-material bundle [finishing / a staple] currently loaded on the after-treatment tray 25, and three standby web materials loaded on it.

[0081] However, since it has turned contrary to the direction which conveys a web-material bundle on the loading tray 26 sponge roller 24d at this time, the drive of M1 motor is stopped here.

[0082] Moreover, since it is prepared like a color on the periphery front face of shaft 24c sponge roller 24d, even if shaft 24c rotates, the drive is constituted so that it may not get across to sponge roller 24d.

[0083] Next, it is engaging with shaft 24c by what the conveyance unit 24 is pushed in for more than sponge roller 24d is in contact with the web-material bundle on the after-treatment tray 25 (it pushes in

so that the sponge section may be dented) according to the pushing device 39 which pushes in the conveyance unit 24 in the direction of an arrow head, and rubber roller 24g with a path smaller than a sponge roller 24d diameter enables it to contact the web-material bundle on the after-treatment tray 25, as shown in drawing 10.

[0084] Then, the drive of M2 motor is started, rubber roller 24g and rubber roller 24f which engaged with shaft 24e prepared so that it might become a pair through a web-material bundle are rotated, and a web-material bundle is made to convey in the loading tray 26 direction.

[0085] Here, the configuration of the pushing device 39 is prepared in the pushing arm 40 which pushes in in contact with the conveyance unit 24, and the pushing arm 40 through a spring, exists the slide plate 41 slid possible [rise and fall], the motor which gives a drive to the slide plate 41, and between them, and consists of transfer gears 42 which transmit the drive of a motor to the slide plate 41.

[0086] Coincidence can be made to convey the web-material bundle [finishing / a staple] currently loaded on the after-treatment tray 25, and three standby web materials loaded on it in the loading tray of same direction 26 direction by the above (drawing 6 (b)).

[0087] If distance from web-material thrust reliance side 23c of conveyance guide pair 23a and 23b to roller 24a of the conveyance unit 24 is set to L1 and distance from the web-material contact side of the web-material back end stopper 29 of the after-treatment tray 25 to roller 24f of the conveyance unit 24 is set to L2 as shown in drawing 7, he is trying to take the relation of $L2 < L1$ here.

[0088] In other words, it is set up so that the direction of the amount of protrusions by the side of the loading tray 26 of the web material loaded into the after-treatment tray 25 may become larger than the amount of protrusions by the side of the loading tray 26 of the web material held at the web-material attaching part in conveyance guide pair 23a and 23b.

[0089] When the web material loaded into the after-treatment tray 25 and the web material held at a web-material attaching part are conveyed by the conveyance unit 24 by this at coincidence, former one will precede.

[0090] Therefore, even if the back end of the web-material bundle [finishing / a staple] currently conveyed in the loading tray 26 direction and a web-material bundle [finishing / a staple / among three standby web materials loaded on it] escapes from roller 24f and is discharged and loaded on the loading tray 26, three standby web materials loaded on it can maintain the condition that roller 24a **** (drawing 7 (c)).

[0091] By it, the moment a web-material bundle [finishing / a staple] escapes from roller 24f, the adjustment gap by a part for the thickness of the bundle and three standby web materials loaded on it falling in the roller 24f side can be prevented.

[0092] The back end of three standby web materials escapes from roller 24a, and if specified quantity conveyance is carried out, the drive of M2 motor will carry out an inversion drive in the direction made to convey in the after-treatment tray 25 direction in which staple processing is performed from the direction made to convey in the loading tray 26 direction of old (drawing 7 (d)).

[0093] By making it and coincidence reverse a motor, the pressurization condition by the pushing device 39 is canceled, the contact to a rubber roller 24g web-material top face is canceled, and it changes to contact of only sponge roller 24d.

[0094] Moreover, the drive of M1 motor is started to coincidence and sponge roller 24d is rotated. And the drawing-in roller 43 using the drive of M3 motor is also used, and three standby web materials are made to convey.

[0095] Here, the one-way clutch is prepared in the drawing-in roller 43, and in order to perform standby actuation of a web material, in case M3 motor is reversed, conveyance guide pair 23a and 23b dash a web material and it sends in to section 23c, it constitutes so that the drawing-in roller 43 may not be reversed. It has prevented that this disturbs the adjustment of the web material loaded on the after-treatment tray 25.

[0096] Three standby web materials which convey the after-treatment tray 25 top reverse M1 motor at the same time they contact a stopper 29, they raise the conveyance unit 24 in the direction of an arrow head, and stop M2 motor, and end conveyance to the after-treatment tray 25 of three standby web materials (drawing 8 (e)).

[0097] Then, a web-material standby device is not made to stand by and load until it reaches the

predetermined number of sheets by which needle binding is carried out to the after-treatment tray 25 to the web material continued and conveyed from the body 1 of image formation equipment. therefore, an inlet-port conveyance roller pair -- a web material is conveyed by 22 and roller 24a, the back end of this web material escapes from roller 24a, when specified quantity conveyance is carried out, start the drive of M1 motor, and fall in the direction of an arrow head, the conveyance unit 24 is made crowded, and roller 24d is made to contact on a web material (drawing 8 (f))

[0098] Roller 24d is rotated by driving M1 motor then, a web material is conveyed along the after-treatment tray 25 top, and this web material is made to dash and load into a stopper 29. And M1 motor is reversed and the conveyance unit 24 is returned to a position. Henceforth, an activity is repeated until it becomes the number of bundles which repeated the actuation mentioned above and was specified.

[0099] an inlet-port conveyance roller pair [in / here / the interior of conveyance guide pair 23a and 23b] -- 22 and roller 24a and the drive transfer system of the drawing-in roller 43 are explained using drawing 11 . Drawing 11 is the mimetic diagram showing the drive transfer system of the web-material processor concerning the gestalt of this operation.

[0100] a pulley is engaged on the shaft of M3 motor used as a driving source -- having -- **** -- an inlet-port conveyance roller pair -- the belt T1 is formed in the gear engaged on the shaft of 22 and the stage gear a44, the stage gear b45, and the form to lay.

[0101] Furthermore, the stage gear a44 is connected with the gear which engaged with shaft 24b prepared in roller 24a, and the stage gear b45 is engaging with the stage gear c46 and the gear engaged on the shaft of the drawing-in roller 43 through belt T3 further through a belt T2.

[0102] By this, M3 motor reaches performing normal rotation or an inversion drive inlet-port conveyance roller pair 22 in connection with it, and roller 24a rotates in normal rotation or the inversion direction.

[0103] Moreover, since the one-way clutch is prepared, the drawing-in roller 43 becomes pivotable only in the direction which draws a web material in a stopper 29.

[0104] Moreover, the web-material detection sensor S1 and the space detection sensor S2 in a finisher 19 are connected to CPU which controls the drive of the whole equipment. CPU performs excitation control of each pressure-welding solenoid while carrying out the roll control of each motor mentioned above based on the detection signal from each sensor.

[0105] The control-block Fig. about said CPU is shown in drawing 13 .

[0106] To be shown in this control-block Fig., ROM and RAM are connected to CPU and various conveyance system-related members, the various members of the loading tray section, and various adjustment/staple-related members are controlled.

[0107] In addition, as various members of the above-mentioned conveyance system relation, as shown in drawing 13 , there are the web-material detection sensor S1, the conveyance drive motors M1, M2, and M3, a pushing device motor, a sheet maintenance arm solenoid, a conveyance koro solenoid, etc.

[0108] Moreover, as various members of the above-mentioned loading tray section, there are the space detection sensor S2, a tray rise-and-fall motor, a rise-and-fall clock sensor, an upper case switch, a lower-berth switch, etc.

[0109] Moreover, as various members of the above-mentioned adjustment/staple relation, there are an adjustment HP sensor, an adjustment motor, a staple HP sensor, a staple motor, etc.

[0110] Next, actuation of the finisher of the above-mentioned configuration at the time of each processing-mode selection is explained.

[0111] (at the time of stack mode selection) Actuation of the finisher at the time of stack mode selection is explained first.

[0112] the delivery roller pair of the body 1 of image formation equipment -- if the web material discharged from 21 is detected by the web-material detection sensor S1 -- M3 motor -- a drive -- beginning -- an inlet-port conveyance roller pair -- 22 and roller 24a rotate.

[0113] M3 motor is rotated more than the part to which the back end of a web material escapes from the nip of roller 24a at least.

[0114] Thereby, a web material is discharged on the after-treatment tray 25.

[0115] And a drive is started, M1 motor pushes down the conveyance unit 24 in the after-treatment tray 25 direction, and is full, and roller 24d is made to contact on the web material discharged on the after-

treatment tray 25.

[0116] Sponge roller 24d is rotated by driving M1 motor then, and a web material is conveyed along the after-treatment tray 25 top, and the drive of M1 motor is stopped and it is made to load in the place dashed against the stopper 29. And M1 motor is reversed and the conveyance unit 24 is returned to a position.

[0117] Next, an adjustment motor (un-illustrating) is rotated, the adjustment plate 28 is moved crosswise which intersects perpendicularly with the web-material conveyance direction, and it has consistency by hitting against the web-material both ends on the after-treatment tray 25. this -- a predetermined number-of-sheets time -- it repeats.

[0118] If it becomes the web-material bundle of predetermined number of sheets, M1 motor is made to drive, and the conveyance unit 24 will be pushed down in the after-treatment tray 25 direction, it will be crowded, and sponge roller 24d will be made to contact on a web-material bundle. And M1 motor is stopped, it is engaging with shaft 24c according to the pushing device 39 by what the conveyance unit 24 is pushed in for more than sponge roller 24d is in contact with the web-material bundle on the after-treatment tray 25 (it pushes in so that the sponge section may be dented), and rubber roller 24g with a path smaller than a sponge roller 24d diameter enables it to contact the web-material bundle on the after-treatment tray 25.

[0119] Then, the drive of M2 motor is started, rubber roller 24g and rubber roller 24f which was prepared so that it might become a pair through a web-material bundle and which engaged with shaft 24e are rotated, and a web-material bundle is made to convey and load in the loading tray 26 direction.

[0120] And a tray shift motor (un-illustrating) is rotated, the specified quantity and the loading tray 26 are dropped, after that, a tray shift motor is reversed and the loading tray 26 is raised. If a loading web-material top face (the maximum top face) is detected by the space detection sensor S2 at this time, the drive of a tray shift motor will be stopped.

[0121] (at the time of staple mode selection) Actuation of the finisher at the time of staple mode selection is explained below.

[0122] In addition, the web material of request number of sheets is discharged on the after-treatment tray 25, and it loads, and since the sequence to adjust is the same sequence as the above-mentioned stack mode, it omits the explanation here.

[0123] The bottom stapler 31 and the upper stapler 32 perform one or more binding processings at the edge of the web material on the after-treatment tray 25 after adjustment termination. After binding processing is completed, a web material is transported and loaded on the loading tray 26 by the same sequence as the stack mode stated also to the point.

[0124] (at the time of the staple mode selection of a large number bundle creation) Next, actuation of the finisher 19 at the time of the staple mode selection of the a large number bundle creation which is the description of the gestalt of this operation is explained.

[0125] A web material is first loaded and adjusted on the after-treatment tray 25 like the above-mentioned stack mode.

[0126] This actuation is repeated until it becomes predetermined number of sheets.

[0127] although it says after it needle binding actuation by staple by the finisher 19 -- the delivery roller pair of the body 1 of image formation equipment -- a web material is conveyed from 21, without being interrupted. and -- if a web material is detected by the web-material detection sensor S1, performing staple actuation on the after-treatment tray 25 -- M3 motor -- a drive -- beginning -- an inlet-port conveyance roller pair -- 22 and roller 24a rotate and a web material is conveyed.

[0128] When the web-material back end is detected by the web-material detection sensor S1 and it is conveyed to the location whose back end of a web material is A points of drawing 4, it is applying excitation to a solenoid and the web-material maintenance arm 27 which conveys a web material in the direction contrary to the conveyance direction which was being conveyed until now, and is energized with the spring to it and coincidence is made to rock in the direction which a tip opens.

[0129] and the back end (in this case, tip of the conveyance direction) of the web material to reverse -- a conveyance guide pair -- 23 sticks and it sends in to reliance section 23c. And excitation of a solenoid is canceled, and a web material can be held and can be made to stand by by what the web-material maintenance arm 27 is returned for (a tip is closed).

[0130] At this time, the web material currently held is loaded ranging over the web-material bundle top currently loaded on the conveyance guide 23 and the after-treatment tray 25 of that lower stream of a river.

[0131] Next, also about the web material conveyed from the body 1 of image formation equipment, same actuation is performed, and the web material of three sheets is stood by and loaded.

[0132] The web-material bundle currently loaded on the after-treatment tray 25 which was performing needle binding processing by the above-mentioned stapler starts the drive of M1 motor, since it has finished the processing, pushes down the conveyance unit 24 in the after-treatment tray 25 direction, and is crowded here, and roller 24d makes contact on the web-material bundle [finishing / a staple] currently loaded on the after-treatment tray 25, and three standby web materials loaded on it.

[0133] And M1 motor is stopped, it is engaging with shaft 24c and rubber roller 24g smaller than a sponge roller 24d diameter enables it to contact the web-material bundle on the after-treatment tray 25 according to the pushing device 39 by what the conveyance unit 24 is pushed in for more than sponge roller 24d is in contact with the web-material bundle on the after-treatment tray 25 (it pushes in so that the sponge section may be dented).

[0134] And the drive of M2 motor is started, rubber roller 24g and rubber roller 24f which was prepared so that it might become a pair through a web-material bundle and which engaged with shaft 24e are rotated, and coincidence is made to convey the web-material bundle [finishing / a staple] currently loaded on the after-treatment tray 25, and three standby web materials loaded on it in the loading tray of same direction 26 direction.

[0135] By making each back end of the web-material bundle [finishing / a staple] currently loaded on the after-treatment tray 25, and three standby web materials loaded on it shift and convey, as mentioned above Even if the back end of a web-material bundle [finishing / a staple] escapes from roller 24f and is delivered [paper] to it and loaded by the loading tray 26, three standby web materials loaded on it can maintain the condition that roller 24a ****.

[0136] Here, the loading tray 26 is made to rotate a tray shift motor (un-illustrating) for processing of the web-material bundle discharged and loaded, and the loading tray 26 is dropped, and after that, only the specified quantity reverses a tray shift motor and raises the loading tray 26.

[0137] If a loading web-material top face (the maximum top face) is detected by the space detection sensor S2 at this time, the drive of a tray shift motor will be stopped.

[0138] On the other hand, the back end of three standby web materials escapes from roller 24a, and if specified quantity conveyance is carried out, the drive of M2 motor will carry out an inversion drive in the direction made to convey in the direction of an after-treatment tray in which staple processing is performed from the direction made to convey in the loading tray 26 direction of old.

[0139] By making it and coincidence reverse the motor which drives the pushing device 39, a pressurization condition is canceled, the contact to a rubber roller 24g web-material top face is canceled, and it changes to contact of only sponge roller 24d.

[0140] Moreover, the drive of M1 motor is started to coincidence and sponge roller 24d is rotated. And the drawing-in roller 43 using the drive of M3 motor is also used, and three standby web materials are made to convey.

[0141] Three standby web materials which convey the after-treatment tray 25 top reverse M1 motor at the same time they contact a stopper 29, they raise the conveyance unit 24, and stop M2 motor, and end conveyance to the after-treatment tray 25 of three standby web materials.

[0142] Next, an adjustment motor (un-illustrating) is rotated and it has consistency by moving the adjustment plate 28 crosswise which intersects perpendicularly with the web-material conveyance direction, and hitting against the web-material both ends on the after-treatment tray 25.

[0143] Then, it is not necessary to make a web-material standby device stand by and load until it reaches the predetermined number of sheets by which needle binding is carried out to the after-treatment tray 25 to the web material continued and conveyed from the body 1 of image formation equipment. therefore, an inlet-port conveyance roller pair -- a web material is conveyed, the back end of this web material escapes from roller 24a, when specified quantity conveyance is carried out by 22 and roller 24a, start the drive of M1 motor, and fall in the after-treatment tray 25 direction, the conveyance unit 24 is made crowded, and roller 24d is made to contact on a web material by it

[0144] Roller 24d is rotated by driving M1 motor then, a web material is conveyed along the after-treatment tray 25 top, and a stopper 29 is made to dash and load. Coincidence is made to reverse M1 motor and the conveyance unit 24 is raised.

[0145] Next, an adjustment motor (un-illustrating) is rotated, the adjustment plate 28 is moved crosswise which intersects perpendicularly with the web-material conveyance direction, and it has consistency by hitting against the web-material both ends on the after-treatment tray 25.

[0146] Thus, said actuation is repeated until it becomes the specified number of bundles.

[0147] And if accumulated to the appointed number of sheets which performs staple processing, the sequence written to the beginning in this mode is met, and it will be henceforth continued until the number [finishing / a staple] of bundles which repeated and wished the same actuation is created.

[0148] Since the web-material maintenance device was prepared in the interior of conveyance pass in the gestalt of this operation as mentioned above, it is not necessary to prepare the pass (buffer roller path mentioned above) of the dedication for making a web material stand by.

[0149] Moreover, ranging over the web-material bundle top loaded on the conveyance pass of existing by the web material made to stand by, and the after-treatment tray on the lower stream of a river, the almost existing part was used for the tooth space holding a web material loading and by making it hold.

[0150] Therefore, preventing the fall of pro DAKUTIBI tea, since it is not necessary to interrupt conveyance of a web material, it is space-saving and it is possible to offer low cost equipment.

[0151] Moreover, it was made to make it convey so that it may be in the condition of having made coincidence conveying the web material which is standing by according to the web-material maintenance device, and the web-material bundle currently loaded into the after-treatment tray in the same direction according to the conveyance device prepared in the lower stream of a river of conveyance pass, and having shifted the back end location to the conveyance direction of each web material or a web-material bundle. It is also possible to offer by this, the equipment which shortens this time amount in this the actuation of a series of, and leads to the improvement in productivity (improvement in pro DAKUTIBI tea) of conveying the web material which was standing by according to the web-material maintenance device in order to perform after treatment next, after usually ending evacuation of the web-material bundle on an after-treatment tray.

[0152] (Gestalt of the 2nd operation) The gestalt of the 2nd operation is shown in drawing 12 . Although the gestalt of implementation of the above 1st showed the case where the member of the shape of an arm as shown in drawing 4 (a) etc. was used as a web-material maintenance means (pinching means) in a web-material standby device, the gestalt of this operation explains the case where the sponge roller 47 is used as a pinching means.

[0153] Since it is the gestalt and identitas of the 1st operation about other configurations and operations, the sign same about the same component is attached and the explanation is omitted.

[0154] Drawing 12 is the typical sectional view of the principal part of the web-material processor concerning the gestalt of operation of the 2nd of this invention.

[0155] The sponge roller 47 was formed in the conveyance path, and it constituted from a gestalt of this operation so that a web material might be pinched and held with this sponge roller 47.

[0156] That is, in the gestalt of this operation, if conveyed to the location whose back end of a web material is A points of drawing 4 (b), reverse the conveyance direction, involve a web material in the sponge roller 47 which is rotating in the drawing Nakaya mark direction, and it is made to hold down, and it is constituted so that may web-material-hold and it may be made to load.

[0157] Here, if you are going to make it carry in a web material to conveyance guide pair 23 when there is a web material which has already held and stood by next, roller 24a of the conveyance unit 24 will rotate in the direction which is going to draw out the web material in the condition of holding with the sponge roller 47.

[0158] Therefore, the spring which gives a certain amount of energization force to the sponge roller 47 is prepared, and it is constituted so that relation to which the holding power of the sponge roller 47 becomes large rather than the drawing force of roller 24a can be maintained.

[0159] Thereby, two or more web materials can be held by space-saving like the case of the gestalt of the above-mentioned implementation.

[0160] (Gestalt of other operations) Although the copying machine was illustrated as image formation

equipment with the gestalt of operation mentioned above, this invention may not be limited to this and may be other image formation equipments, such as a printer and facsimile. Even if it is the case of which image formation equipment, the same effectiveness can be acquired by applying the web-material processor concerning the gestalt of this above-mentioned implementation.

[0161] Moreover, in the case of the web-material processor which it has in one in image formation equipment although the web-material processor which can be detached and attached freely was illustrated to image formation equipment by old explanation as above-mentioned, it applies similarly, but it can do, and the same effectiveness can be acquired.

[0162] Moreover, although the case of an electrophotography method was illustrated as a recording method in the image formation equipment mentioned above, it is not limited to this and other recording methods, such as an ink jet method, can be adopted.

[0163] Moreover, although a stapler means to create a web-material bundle was illustrated as an after-treatment means in the interior of the finisher of a web-material processor as mentioned above, it is not limited to this and web-material bundle creation means, such as a pasting bookbinding device, can also be applied.

[0164]

[Effect of the Invention] As explained above, it can realize space-saving and low cost, aiming at improvement in pro DAKUTIBI tea, since this invention does not need to prepare the pass of the dedication for making a web material stand by since the web-material attaching part which can two or more sheet hold a web material was prepared in the conveyance path etc. and does not need to interrupt conveyance of a web material.

[0165] Moreover, when holding a web material by the web-material attaching part, the tooth space for holding a web material is narrow, and can be managed with holding a web material, after the tip of a web material has exceeded the web-material conveyance means.

[0166] moreover, in being able to prepare in coincidence the web material held at the web-material bundle by which the web-material bundle conveyance device was loaded into the 1st web-material loading section, and the web-material attaching part possible [conveyance] and conveying these to coincidence It conveys so that the web-material bundle loaded into the 1st web-material loading section may precede rather than the web material held at the web-material attaching part. By a web-material bundle conveyance device being controlled so that the web material currently held at the web-material attaching part may be conveyed in the 1st web-material loading section, after making a web-material bundle load into the 2nd loading section In order to start actuation for discharging the sheet bundle after after treatment, and the next after-treatment actuation to coincidence, productivity improves.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention is constituted free [attachment and detachment] to image formation equipments, such as a copying machine and a printer, and relates to the web-material processor which performs after treatment of a web material [finishing / image formation] or the web-material processor which it has in one to image formation equipment, and image formation equipment equipped with the web-material processor.

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PRIOR ART

[Description of the Prior Art] In recent years, web-material processors, such as a ***** sorter, are developed in the web material [finishing / image formation] as an option of image formation equipments, such as an electrophotography copying machine and a laser beam printer.

[0003] And not only a sort function but a certain amount of web material is loaded and adjusted, or the stapler which carries out needle binding is formed and it is becoming various with it being as creating a web-material bundle **** at this kind of web-material processor.

[0004] In the web-material processor equipped with the stapler which carries out needle binding, after passing the conveyance way formed in the interior of a body in the web material conveyed in the body of a web-material processor and loading the tray for after treatment, it is made to perform binding actuation.

[0005] By the way, when filing a web-material bundle, the stapler which is a binding means is moved and it is made to perform one-place binding or two or more binding (usually two-place binding).

[0006] Here, while performing binding actuation, the web material of the following job cannot be loaded into the tray for after treatment. Therefore, having opened between the papers between jobs was common between binding actuation.

[0007] However, if it opens in this way between the papers between jobs, pro DAKUTIBI tea will fall. It is indicated by the JP,9-48545,A public presentation official report as a technique of preventing the fall of such pro DAKUTIBI tea.

[0008] This technique is explained with reference to drawing 2 . Drawing 2 is the typical sectional view of the web-material processor concerning the conventional technique.

[0009] With this equipment, the web material was twisted around the rotating buffer roller, and the buffer roller path which makes conveyance to an after-treatment tray stand by is prepared in the conveyance path in the middle of conveying a web material on an after-treatment tray.

[0010] After storing the web material conveyed from image formation equipment in the buffer roller path by such configuration, and a front web-material bundle's ending binding actuation on an after-treatment tray and conveying from an after-treatment tray, he was trying to prevent the fall of pro DAKUTIBI tea by making it make the tray for after treatment convey the web-material bundle currently stored in the buffer roller.

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EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, it can realize space-saving and low cost, aiming at improvement in pro DAKUTIBI tea, since this invention does not need to prepare the pass of the dedication for making a web material stand by since the web-material attaching part which can two or more sheet hold a web material was prepared in the conveyance path etc. and does not need to interrupt conveyance of a web material.

[0165] Moreover, when holding a web material by the web-material attaching part, the tooth space for holding a web material is narrow, and can be managed with holding a web material, after the tip of a web material has exceeded the web-material conveyance means.

[0166] moreover, in being able to prepare in coincidence the web material held at the web-material bundle by which the web-material bundle conveyance device was loaded into the 1st web-material loading section, and the web-material attaching part possible [conveyance] and conveying these to coincidence It conveys so that the web-material bundle loaded into the 1st web-material loading section may precede rather than the web material held at the web-material attaching part. By a web-material bundle conveyance device being controlled so that the web material currently held at the web-material attaching part may be conveyed in the 1st web-material loading section, after making a web-material bundle load into the 2nd loading section In order to start actuation for discharging the sheet bundle after after treatment, and the next after-treatment actuation to coincidence, productivity improves.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in the case of the web-material processor concerning the above conventional techniques, the following problems had arisen.

[0012] In order to make conveyance to an after-treatment tray stand by, when it considers as the configuration which prepares a buffer roller path, in order to have a buffer roller path, a big configuration will be needed, and a tooth space will be taken. Therefore, while the magnitude of the web-material processor itself will become large, there was a problem that cost will also start, in connection with it.

[0013] The place which it was made in order that this invention might solve the technical problem of the above-mentioned conventional technique, and is made into the purpose is to offer a space-saving and low cost web-material processor and image formation equipment, aiming at improvement in pro DAKUTIBI tea.

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MEANS

[Means for Solving the Problem] If it is in this invention in order to attain the above-mentioned purpose, in the web-material processor equipped with a web-material sending means to send a web material into the interior of equipment, and the conveyance path where the web material sent in by this web-material sending means is conveyed, it is characterized by preparing the web-material attaching part which can two or more sheet hold a web material in said conveyance path.

[0015] Said web-material attaching part is characterized by being prepared in the gravity direction lower part rather than the web-material conveyance side sent in by said web-material sending means.

[0016] It is characterized by pinching the web material which turned the inside of said conveyance path to the upstream, and was conveyed, and having a pinching means to hold a web material to said web-material attaching part by being prepared in said conveyance path downstream, and changing the conveyance direction to the upstream by said web-material conveyance means, after the web-material conveyance means which can change the conveyance direction of a web material to the downstream and the upstream, and the back end of the web material conveyed escape from said web-material sending means.

[0017] While holding a web material after the tip of a web material has exceeded said web-material conveyance means in holding a web material by said web-material attaching part, it is characterized by being set up so that the direction of the force which pinches a web material with said pinching means may become large rather than the conveyance force of making a web material conveying in the direction of a lower stream of a river with said web-material conveyance means.

[0018] An after-treatment means to perform after treatment to the web material conveyed by said conveyance path, The 1st web-material loading section which loads a web material in order to process to a web material with said after-treatment means, and the web material after processing was performed by said after-treatment means, Or it is characterized by having the 2nd web-material loading section loading the web material which does not process with this after-treatment means, and the web-material bundle conveyance device in which the web-material bundle loaded into said 1st web-material loading section is conveyed in said 2nd web-material loading section.

[0019] While said web-material bundle conveyance device can prepare in coincidence the web material held at the web-material bundle loaded into said 1st web-material loading section, and said web-material attaching part possible [conveyance] It conveys so that the web-material bundle loaded into said 1st web-material loading section may precede rather than the web material held at said web-material attaching part, in conveying these to coincidence. After making said web-material bundle load into said 2nd loading section, it is characterized by controlling said web-material bundle conveyance device so that the web material currently held at said web-material attaching part may be conveyed in said 1st web-material loading section.

[0020] It is characterized by having the adjustment criteria member which dashes and adjusts the back end of the web material conveyed by the upstream with said web-material conveyance means, the interior material of a back end proposal which shows the back end of a web material to this adjustment criteria member, and the web-material presser-foot member which presses down the web-material bundle loaded into the sheet adjusted by said adjustment criteria member and said 1st web-material loading section.

[0021] Both the web material loaded into said 1st web-material loading section and the web material

held at said web-material attaching part are characterized by these web materials being conveyed by coincidence according to this web-material bundle conveyance device by setting in the condition that the tip of these web materials was projected at said 2nd web-material loading section side exceeding said web-material bundle conveyance device.

[0022] It is characterized by being conveyed so that the web-material bundle loaded into said 1st web-material loading section may precede rather than the web material held at said web-material attaching part by being set up so that the direction of the amount of protrusions by the side of said 2nd web-material loading section of the web material loaded into said 1st web-material loading section may become larger than the amount of protrusions by the side of said 2nd web-material loading section of the web material held at said web-material attaching part.

[0023] Said pinching member is characterized by being the arm member which is prepared in said conveyance path and also has the function which guides the conveyance direction of a web material and which is controlled free [rocking].

[0024] Said pinching member is characterized by being the roller formed in said conveyance path.

[0025] Said after-treatment means is characterized by the thing of the punch means to perform punch processing to a stapler means to carry out ***** to a web-material bundle, a bookbinding-sized means to bookbinding-ize a web-material bundle, and a web material included for any one at least.

[0026] the condition that this image formation equipment was equipped while being constituted free [attachment and detachment] to the image formation equipment which forms an image on a web material -- this image formation equipment -- the web material by which image formation was carried out is sent in in equipment with said web-material sending means, and it is characterized by performing after treatment to this web material.

[0027] Moreover, if it is in the image formation equipment of this invention, it is characterized by having an image formation means to form an image on the web material conveyed, and the above-mentioned web-material processor which performs after treatment to the web material which performed image formation with this image formation means.

[0028]

[Embodiment of the Invention] With reference to a drawing, the gestalt of suitable implementation of this invention is explained in detail in instantiation below. However, the dimension of the component part indicated by the gestalt of this operation, the quality of the material, a configuration, its relative configuration, etc. are not the things of those meanings limited to seeing about the range of this invention, as long as there is no specific publication especially.

[0029] (Gestalt of the 1st operation) With reference to drawing 1 , drawing 3 - drawing 11 , and drawing 13 , the web-material processor and image formation equipment concerning the gestalt of operation of the 1st of this invention are explained.

[0030] In addition, the case where it is option-equipment with which the web-material processor consisted of explanation of the gestalt of this operation free [attachment and detachment] to image formation equipment as independent equipment is explained to an example. However, although it cannot be overemphasized that it is applied also when preparing for image formation equipment in one, since especially a functionally different thing from the case of the web-material processor explained below does not have the web-material processor of this invention, the explanation is omitted.

[0031] Drawing 1 is the typical sectional view showing the condition of having been equipped with the web-material processor to image formation equipment. In addition, in the example of illustration, image formation equipment is a copying machine and a web-material processor is a finisher.

[0032] First, the body of image formation equipment is explained.

[0033] (Image formation equipment) The body 1 of image formation equipment is equipped with the manuscript feed gear 2.

[0034] A manuscript is laid in the manuscript installation section 3, carries out sequential separation one sheet at a time by the feed section 4, and is supplied. then, a resist roller pair -- 5 stops and a skew is corrected by forming a loop formation. Then, it passes along the introductory pass 6 and the image formed in the manuscript front face is read by passing a reading station 7. The manuscript which passed the reading station 7 passes along the discharge pass 8, and is discharged on the discharge tray 9.

[0035] moreover, in reading front flesh-side both sides, it carries out as mentioned above first because

reading of a front face passes a reading station 7 -- having -- the after that and discharge pass 8 -- a passage -- a reversal roller pair -- the condition of having carried out front flesh-side reversal by 10 -- again -- a resist roller pair -- it is sent to 5.

[0036] and surface reading -- the same -- a resist roller pair -- a skew sets right by 5 -- having -- the introductory pass 6 -- a passage -- a reading station 7 -- a front face (it is a rear face at this time) -- forming -- having had -- an image -- reading -- having . And it passes along the discharge pass 8 and is discharged to the discharge tray 9.

[0037] The reflected light obtained by on the other hand irradiating light according to an illumination system 11 to the manuscript image which passes a reading station 7 is led to an optical element 13 (CCD or other components) by the mirror 12, and image data is obtained. And the laser light based on this image data is irradiated at the photo conductor drum 14, and a latent image is formed.

[0038] However, although especially illustration is not carried out, it can also constitute so that the reflected light may be irradiated at the direct photo conductor drum 14 and a latent image may be formed by the above-mentioned mirror 12.

[0039] A toner image is formed with the toner with which the latent image formed in the photo conductor drum 14 was supplied from the toner feeder which is not illustrated further.

[0040] 15 is a cassette which holds record media, such as paper or plastic film. It is supplied to the location where a record medium counters with the photo conductor drum 14 from a cassette 15 according to a record signal, and the toner image formed in the photo conductor drum 14 by imprint equipment 16 is imprinted on a record medium. And the record medium with which the toner image was imprinted is sent to an anchorage device 17, and it is fixed to it.

[0041] When forming an image in both sides of a record medium, by the anchorage device 17, the record medium with which it was fixed to the image of one side is again sent between the photo conductor drum 14 and imprint equipment 16 through the double-sided pass 18 prepared in the downstream of an anchorage device 17, and the NA image for a web material is formed in a rear face. And it is fixed to a toner image with an anchorage device 17, and is discharged outside (finisher 19 side).

[0042] (Web-material processor) A finisher 19 is explained with reference to drawing 3 . Drawing 3 is the typical sectional view of a web-material processor (finisher).

[0043] 19 is a finisher as a web-material processor, and is engaged and (wearing) used for the body 1 of image formation equipment.

[0044] 20 -- an inlet-port guide pair -- it is -- the delivery roller pair of the body 1 of image formation equipment -- it shows reception and a finisher 19 to the web material discharged from 21. S1 is a web-material detection sensor, and detects the web material which has advanced into the finisher 19.

[0045] 22 is an inlet-port conveyance roller pair as a web-material sending means which **** and conveys a web material, and sends a web material into the interior of equipment. 23a and 23b -- a conveyance guide pair -- it is -- an inlet-port conveyance roller pair -- the web material conveyed from 22 is guided and the conveyance path is formed.

[0046] Moreover, although conveyance guide pair 23a and 23b are explained in detail later, it serves also as the web-material loading function to make a web material stand by. In other words, the web-material attaching part which can two or more sheet hold a web material is prepared in the conveyance path.

[0047] Although it is behind detailed also here and 24 is explained, it is a conveyance unit as a web-material bundle conveyance device which has the function to convey a web material or a web-material bundle from conveyance guide pair 23a and 23b on the after-treatment tray 25 as the 1st web-material loading section, and the function conveyed on the loading tray 26 as the 2nd web-material loading section from the after-treatment tray 25.

[0048] Back end dropping [38] for making the back end of the web material conveyed from conveyance guide pair 23a and 23b install in the after-treatment tray 25 certainly near the conveyance unit 24 is formed.

[0049] moreover, the interior of conveyance guide pair 23a and 23b -- setting -- an inlet-port conveyance roller pair -- in order to make the web material conveyed from the body 1 of image formation equipment stand by to conveyance guide pair 23a and 23b near 22 before being conveyed by

the after-treatment tray 25, the web-material maintenance arm 27 as a pinching member for ****(ing) and holding a web material is formed.

[0050] This web-material maintenance arm 27 serves as the function to guide the back end, and the function to hold a web material, and is controlled free [rocking].

[0051] 28 is an adjustment plate which constitutes an adjustment means, it guides the both ends of the web material discharged by the after-treatment tray 25, carries out ***** adjustment, and is arranged at the crosswise both sides which intersect perpendicularly with the conveyance direction of the web material discharged, respectively.

[0052] 29 is a stopper, is discharged by the after-treatment tray 25 and catches the back end of the web material sent in with the drawing-in roller 43.

[0053] The after-treatment function which is a web material with the gestalt of this operation here

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the typical sectional view (principal-section Fig.) showing the condition of having been equipped with the web-material processor to image formation equipment.

[Drawing 2] It is the typical sectional view (principal-section Fig.) of the web-material processor concerning the conventional technique.

[Drawing 3] It is the typical sectional view of a web-material processor.

[Drawing 4] It is the device and the explanatory view of operation for making a web material stand by.

[Drawing 5] It is the device and the explanatory view of operation for making a web material stand by.

[Drawing 6] It is the device and the explanatory view of operation of a conveyance unit in the web-material processor concerning the gestalt of operation of this invention.

[Drawing 7] It is the device and the explanatory view of operation of a conveyance unit in the web-material processor concerning the gestalt of operation of this invention.

[Drawing 8] It is the device and the explanatory view of operation of a conveyance unit in the web-material processor concerning the gestalt of operation of this invention.

[Drawing 9] It is the perspective view of the drive transfer device of the conveyance unit in the web-material processor concerning the gestalt of operation of this invention.

[Drawing 10] It is the explanatory view of the pushing device of the conveyance unit in the web-material processor concerning the gestalt of operation of this invention of operation.

[Drawing 11] It is the mimetic diagram showing the drive transfer system of the web-material processor concerning the gestalt of operation of this invention.

[Drawing 12] It is the typical sectional view of the principal part of the web-material processor concerning the gestalt of operation of the 2nd of this invention.

[Drawing 13] It is the control-block Fig. of the web-material processor concerning the gestalt of operation of this invention.

[Description of Notations]

1 Body of Image Formation Equipment

2 Manuscript Feed Gear

3 Manuscript Installation Section

4 Feed Section

5 Resist Roller Pair

6 Introductory Pass

7 Reading Station

8 Discharge Pass

9 Discharge Tray

10 Reversal Roller Pair

11 Illumination System

12 Mirror

13 Optical Element

14 Photo Conductor Drum

15 Cassette

16 Imprint Equipment

17 Anchorage Device
18 Double-sided Pass
19 Finisher
20 Inlet-Port Guide Pair
21 Delivery Roller Pair
22 Inlet-Port Conveyance Roller Pair
23a, 23b Conveyance guide pair
24 Conveyance Unit
25 After-Treatment Tray
26 Loading Tray
27 Web-Material Maintenance Arm
28 Adjustment Plate
29 Stopper
31 Bottom Stapler
32 Upper Stapler
33 Shaft
34 Shaft
35 Screw Shaft
36 Screw Shaft
37 Back End Guide
38 Drop [Back End].
39 Pushing Device
40 Pushing Arm
41 Slide Plate
42 Transfer Gear
43 Drawing-in Roller
44 Stage Gear A
45 Stage Gear B
46 Stage Gear C
47 Sponge Roller
S1 Web-material detection sensor
S2 Space detection sensor

[Translation done.]

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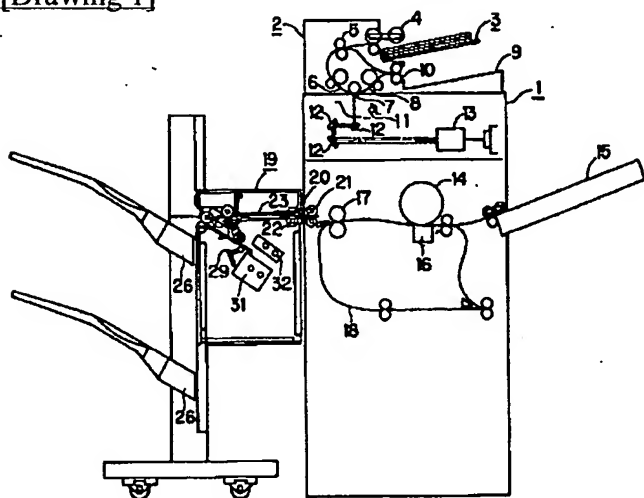
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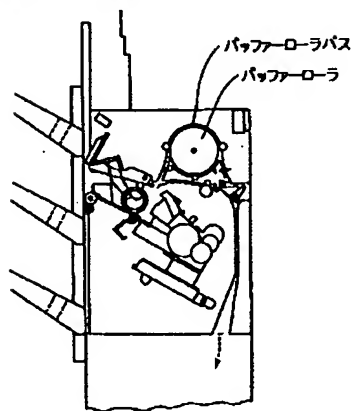
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DRAWINGS

[Drawing 1]



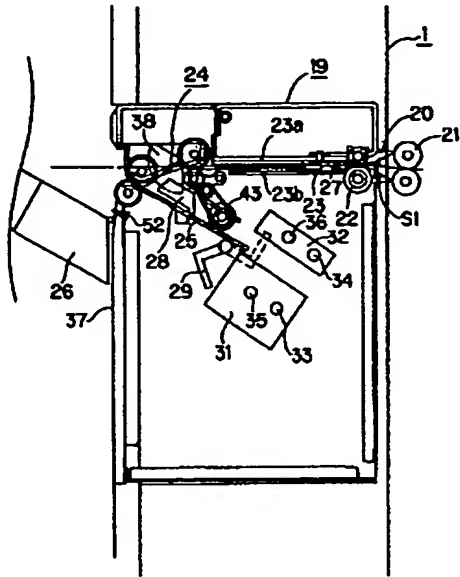
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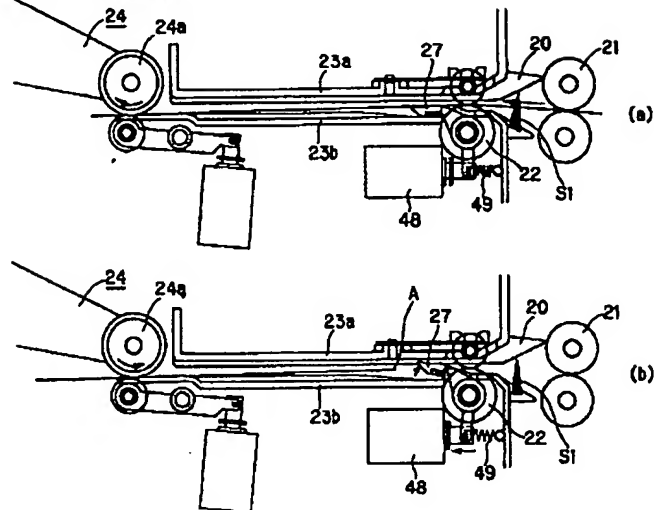
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[Drawing 3]

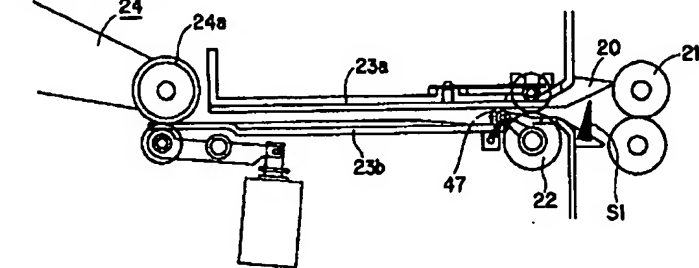
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[Drawing 4]

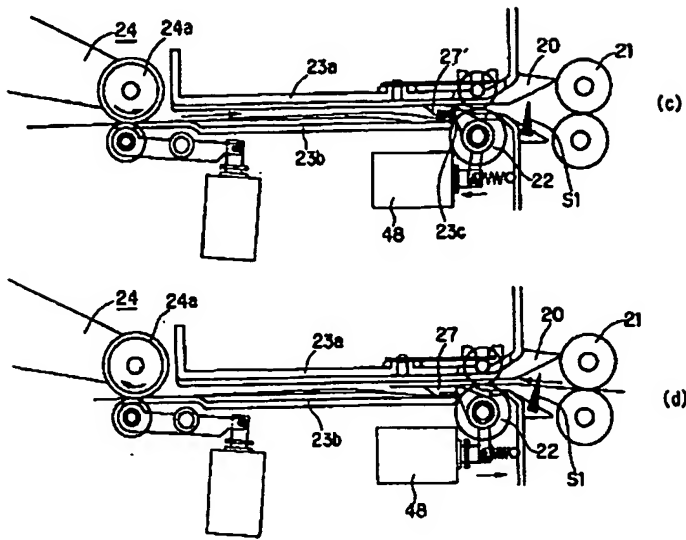


[Drawing 12]

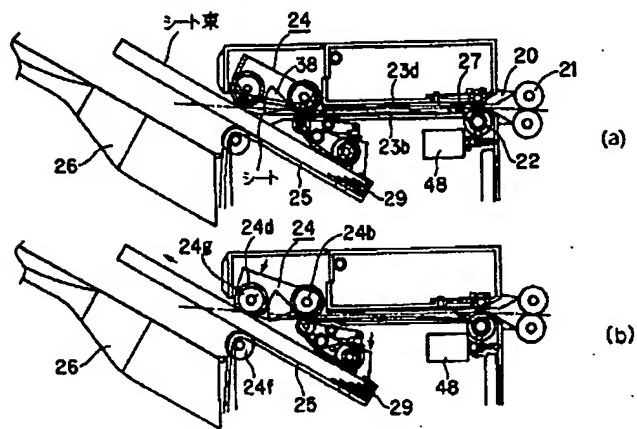


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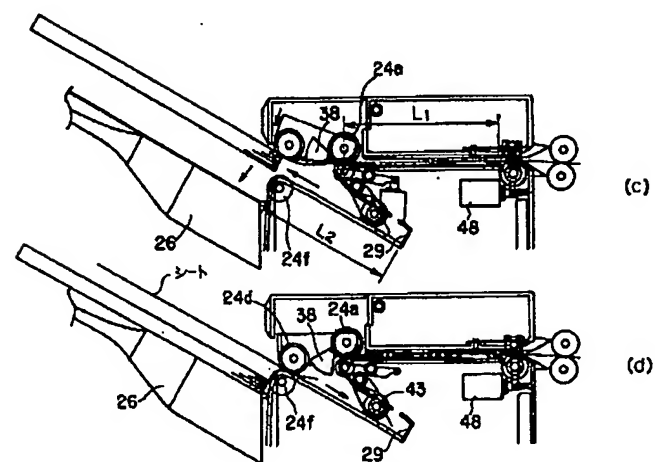
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[Drawing 6]

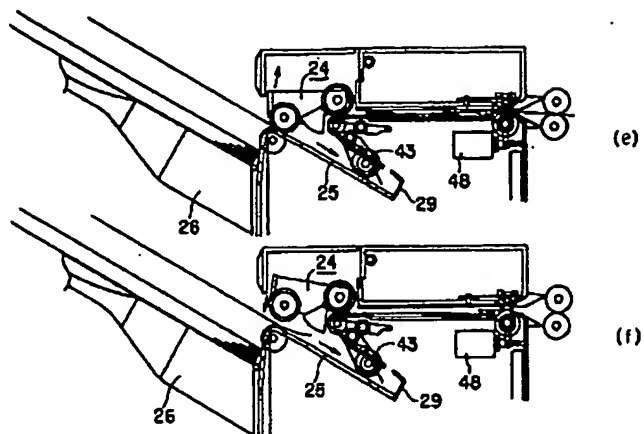


[Drawing 7]

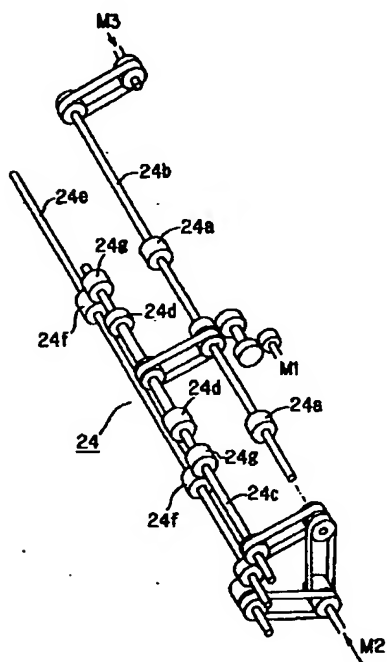


[Drawing 8]

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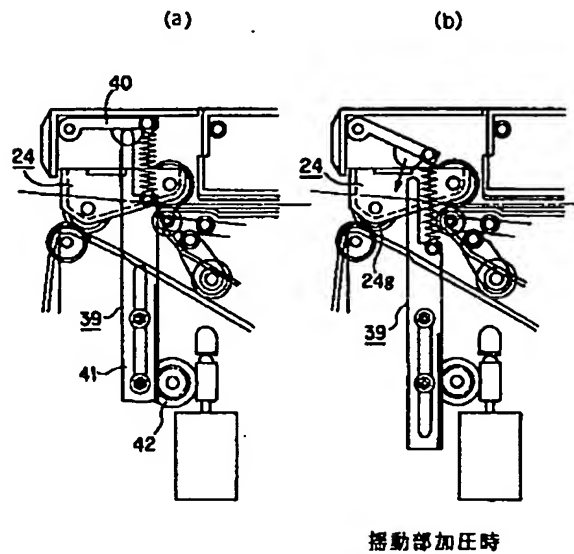


[Drawing 9]

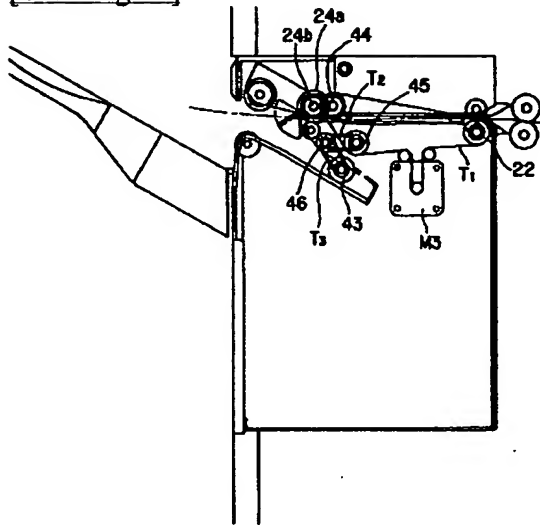


[Drawing 10]

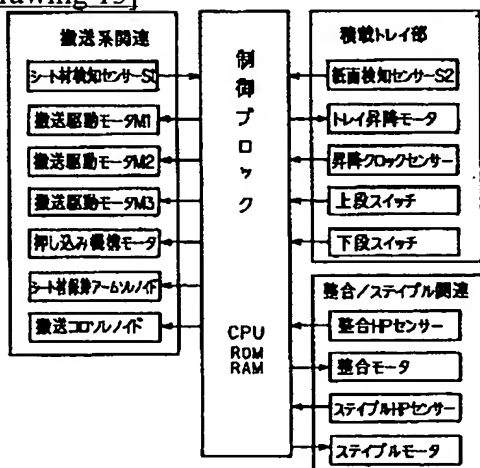
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[Drawing 11]



[Drawing 13]



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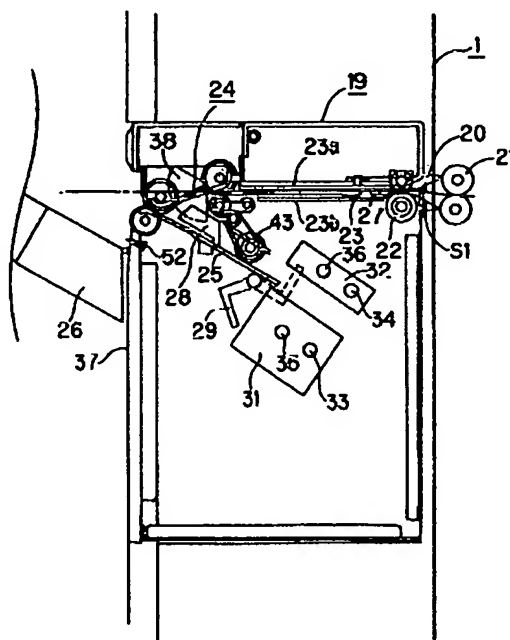
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(54) 【発明の名称】 シート材処理装置及び画像形成装置

(57) 【要約】

【課題】 プロダクティビティーの向上を図りつつ、省スペースかつ低コストなシート材処理装置及び画像形成装置を提供する。

【解決手段】 シート材の後端が入口搬送ローラ対22を通過し、所定量搬送されると、上流方向にこのシート材を搬送し、スイッチバックしてくるシート材の後端を、搬送ガイド対23のつき当て部23cまで送り込み、シート材保持アーム27によって、このシート材を保持して、シート材を待機させる。この時、保持されているシート材は、搬送ガイド23a、23b及び、その下流の後処理トレイ25もしくはそこに積載されているシート材束上にまたがって積載される。



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【特許請求の範囲】

【請求項1】装置内部にシート材を送り込むシート材送り込み手段と、

該シート材送り込み手段によって送り込まれるシート材が搬送される搬送通路と、を備えたシート材処理装置において、

前記搬送通路内に、シート材を複数枚保持可能なシート材保持部が設けられることを特徴とするシート材処理装置。

【請求項2】前記シート材保持部は、前記シート材送り込み手段によって送り込まれるシート材搬送面よりも重力方向下方に設けられることを特徴とする請求項1に記載のシート材処理装置。

【請求項3】前記搬送通路下流側に設けられ、シート材の搬送方向を下流側と上流側に切り替えることのできるシート材搬送手段と、

搬送されるシート材の後端が前記シート材送り込み手段を抜けた後に、前記シート材搬送手段によって搬送方向が上流側に切り替えられることにより、前記搬送通路内を上流側に向けて搬送されたシート材を挟持して、前記シート材保持部にシート材を保持する挟持手段と、を備えることを特徴とする請求項1または2に記載のシート材処理装置。

【請求項4】前記シート材保持部でシート材を保持する場合には、シート材の先端が前記シート材搬送手段を越えた状態でシート材を保持すると共に、前記シート材搬送手段によって、シート材を下流方向に搬送させる搬送力よりも、前記挟持手段によりシート材を挟持する力の方が大きくなるように設定されていることを特徴とする請求項3に記載のシート材処理装置。

【請求項5】前記搬送通路により搬送されたシート材に対して後処理を施す後処理手段と、

該後処理手段によってシート材に処理を施すためにシート材を積載する第1シート材積載部と、

前記後処理手段によって処理が施された後のシート材、あるいは、該後処理手段によって処理を施さないシート材を積載する第2シート材積載部と、

前記第1シート材積載部に積載されたシート材束を前記第2シート材積載部に搬送するシート材束搬送機構と、を備えることを特徴とする請求項1～4のいずれか一つに記載のシート材処理装置。

【請求項6】前記シート材束搬送機構は、前記第1シート材積載部に積載されたシート材束と前記シート材保持部に保持されたシート材を同時に搬送可能に設けられると共に、

これらを同時に搬送する場合には、前記第1シート材積載部に積載されたシート材束の方が前記シート材保持部に保持されたシート材よりも先行するように搬送し、前記シート材束を前記第2積載部に積載させた後に、前記シート材保持部に保持されていたシート材を前記第1シ

ート材積載部に搬送するように、前記シート材束搬送機構は制御されることを特徴とする請求項5に記載のシート材処理装置。

【請求項7】前記シート材搬送手段によって上流側に搬送されてきたシート材の後端を突き当てて整合する整合基準部材と、

該整合基準部材へシート材の後端を案内する後端案内部材と、

前記整合基準部材によって整合されたシート及び前記第1シート材積載部に積載されたシート材束を押さえるシート材押さえ部材と、を備えることを特徴とする請求項5または6に記載のシート材処理装置。

【請求項8】前記第1シート材積載部に積載されるシート材、及び、前記シート材保持部に保持されるシート材のいずれも、これらシート材の先端が前記シート材束搬送機構を越えて、前記第2シート材積載部側に突出された状態におかれることにより、該シート材束搬送機構によって、これらのシート材が同時に搬送されることを特徴とする請求項6または7に記載のシート材処理装置。

【請求項9】前記第1シート材積載部に積載されるシート材の前記第2シート材積載部側への突出量の方が、前記シート材保持部に保持されるシート材の前記第2シート材積載部側への突出量よりも大きくなるように設定されることにより、前記第1シート材積載部に積載されたシート材束の方が前記シート材保持部に保持されたシート材よりも先行するように搬送されることを特徴とする請求項8に記載のシート材処理装置。

【請求項10】前記挟持部材は、前記搬送通路内に設けられ、シート材の搬送方向をガイドする機能をも有する、揺動自在に制御されるアーム部材であることを特徴とする請求項3～9のいずれか一つに記載のシート材処理装置。

【請求項11】前記挟持部材は、前記搬送通路内に設けられるローラであることを特徴とする請求項3～9のいずれか一つに記載のシート材処理装置。

【請求項12】前記後処理手段は、シート材束に針打ちを行うステイプラー手段、シート材束を製本化する製本化手段及びシート材にパンチ処理を施すパンチ手段のうちの少なくともいずれか一つを含むことを特徴とする請求項5～11のいずれか一つに記載のシート材処理装置。

【請求項13】シート材上に画像を形成する画像形成装置に対して着脱自在に構成されると共に、該画像形成装置に装着された状態で、該画像形成装置によって画像形成されたシート材を、前記シート材送り込み手段によって装置内に送り込み、該シート材に対して後処理を行うことを特徴とする請求項1～12のいずれか一つに記載のシート材処理装置。

【請求項14】搬送されるシート材上に画像を形成する

画像形成手段と、

該画像形成手段によって画像形成を行ったシート材に対して後処理を施す請求項1～12のいずれか一つに記載のシート材処理装置と、を備えることを特徴とする画像形成装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、例えば複写機やプリンタ等の画像形成装置に対して着脱自在に構成され、画像形成済みのシート材の後処理を行うシート材処理装置、あるいは、画像形成装置に対して一体的に備えられるシート材処理装置、及びシート材処理装置を備えた画像形成装置に関するものである。

【0002】

【従来の技術】近年、電子写真複写機やレーザービームプリンタなどの画像形成装置のオプションとして、画像形成済みのシート材を仕分けるソータなどのシート材処理装置が開発されている。

【0003】しかも、この種のシート材処理装置には、ソート機能のみならず、ある程度のシート材を積載・整合したり、針綴りするステイプラーを設けシート材束を作成したりと多様になってきている。

【0004】針綴りするステイプラーを備えたシート材処理装置においては、シート材処理装置本体内部に搬送されたシート材を、本体内部に形成された搬送路を通過させて後処理用トレイに積載した後に綴じ動作を行うようにしている。

【0005】ところで、シート材束を綴じる場合は、綴じ手段であるステイプラーを移動させて1箇所綴じ又は複数綴じ（通常は2箇所綴じ）を行うようにしている。

【0006】ここで、綴じ動作を行っている間は、次のジョブのシート材を後処理用トレイに積載することができない。従って、綴じ動作の間はジョブ間の紙間をあけるのが一般的であった。

【0007】しかし、このようにジョブ間の紙間をあけると、プロダクティビティーが低下してしまう。このようなプロダクティビティーの低下を防止する技術としては、特開平9-48545号公開公報に開示されている。

【0008】この技術について図2を参照して説明する。図2は従来技術に係るシート材処理装置の模式的断面図である。

【0009】この装置では、シート材を後処理トレイに搬送する途中の搬送通路に、シート材を、回転するバッファローラに巻きつけて、後処理トレイへの搬送を待機させるバッファローラパスを設けている。

【0010】このような構成により、画像形成装置から搬送されてくるシート材をバッファローラパス内に蓄えておき、前のシート材束が後処理トレイ上で綴じ動作を終了して後処理トレイより搬送した後に、バッファロ

ーラに蓄えられていたシート材束を後処理用トレイに搬送させるようにすることによって、プロダクティビティーの低下を防ぐようにしていた。

【0011】

【発明が解決しようとする課題】しかしながら、上記のような従来技術に係るシート材処理装置の場合には、下記のような問題が生じていた。

【0012】後処理トレイへの搬送を待機させるために、バッファローラパスを設ける構成とした場合には、バッファローラパスを備えるために大きな構成を必要とし、スペースを取ってしまう。従って、シート材処理装置自体の大きさが大きくなってしまいと同時に、それに伴って、コストもかかってしまうという問題があった。

【0013】本発明は上記の従来技術の課題を解決するためになされたもので、その目的とするところは、プロダクティビティーの向上を図りつつ、省スペースかつ低コストなシート材処理装置及び画像形成装置を提供することにある。

【0014】

【課題を解決するための手段】上記目的を達成するために本発明にあっては、装置内部にシート材を送り込むシート材送り込み手段と、該シート材送り込み手段によって送り込まれるシート材が搬送される搬送通路と、を備えたシート材処理装置において、前記搬送通路内に、シート材を複数枚保持可能なシート材保持部が設けられることを特徴とする。

【0015】前記シート材保持部は、前記シート材送り込み手段によって送り込まれるシート材搬送面よりも重力方向下方に設けられることを特徴とする。

【0016】前記搬送通路下流側に設けられ、シート材の搬送方向を下流側と上流側に切り替えることのできるシート材搬送手段と、搬送されるシート材の後端が前記シート材送り込み手段を抜けた後に、前記シート材搬送手段によって搬送方向が上流側に切り替えられることにより、前記搬送通路内を上流側に向けて搬送されたシート材を挟持して、前記シート材保持部にシート材を保持する挟持手段と、を備えることを特徴とする。

【0017】前記シート材保持部でシート材を保持する場合には、シート材の先端が前記シート材搬送手段を越えた状態でシート材を保持すると共に、前記シート材搬送手段によって、シート材を下流方向に搬送させる搬送力よりも、前記挟持手段によりシート材を挟持する力の方が大きくなるように設定されていることを特徴とする。

【0018】前記搬送通路により搬送されたシート材に対して後処理を施す後処理手段と、前記後処理手段によってシート材に処理を施すためにシート材を積載する第1シート材積載部と、前記後処理手段によって処理が施された後のシート材、あるいは、該後処理手段によって

処理を施さないシート材を積載する第2シート材積載部と、前記第1シート材積載部に積載されたシート材束を前記第2シート材積載部に搬送するシート材束搬送機構と、を備えることを特徴とする。

【0019】前記シート材束搬送機構は、前記第1シート材積載部に積載されたシート材束と前記シート材保持部に保持されたシート材を同時に搬送可能に設けられると共に、これらを同時に搬送する場合には、前記第1シート材積載部に積載されたシート材束の方が前記シート材保持部に保持されたシート材よりも先行するように搬送し、前記シート材束を前記第2積載部に積載させた後に、前記シート材保持部に保持されていたシート材を前記第1シート材積載部に搬送するように、前記シート材束搬送機構は制御されることを特徴とする。

【0020】前記シート材搬送手段によって上流側に搬送されてきたシート材の後端を突き当てて整合する整合基準部材と、該整合基準部材へシート材の後端を案内する後端案内部材と、前記整合基準部材によって整合されたシート及び前記第1シート材積載部に積載されたシート材束を押さえるシート材押さえ部材と、を備えることを特徴とする。

【0021】前記第1シート材積載部に積載されるシート材、及び、前記シート材保持部に保持されるシート材のいずれも、これらシート材の先端が前記シート材束搬送機構を越えて、前記第2シート材積載部側に突出された状態におかれることにより、該シート材束搬送機構によって、これらのシート材が同時に搬送されることを特徴とする。

【0022】前記第1シート材積載部に積載されるシート材の前記第2シート材積載部側への突出量の方が、前記シート材保持部に保持されるシート材の前記第2シート材積載部側への突出量よりも大きくなるように設定されることにより、前記第1シート材積載部に積載されたシート材束の方が前記シート材保持部に保持されたシート材よりも先行するように搬送されることを特徴とする。

【0023】前記挟持部材は、前記搬送通路内に設けられ、シート材の搬送方向をガイドする機能をも有する、揺動自在に制御されるアーム部材であることを特徴とする。

【0024】前記挟持部材は、前記搬送通路内に設けられるローラであることを特徴とする。

【0025】前記後処理手段は、シート材束に針打ちを行うステイプラー手段、シート材束を製本化する製本化手段及びシート材にパンチ処理を施すパンチ手段のうちの少なくともいずれか一つを含むことを特徴とする。

【0026】シート材上に画像を形成する画像形成装置に対して着脱自在に構成されると共に、該画像形成装置に装着された状態で、該画像形成装置によって画像形成されたシート材を、前記シート材送り込み手段によって装

置内に送り込み、該シート材に対して後処理を行うことを特徴とする。

【0027】また、本発明の画像形成装置にあつては、搬送されるシート材上に画像を形成する画像形成手段と、該画像形成手段によって画像形成を行ったシート材に対して後処理を施す上記のシート材処理装置と、を備えることを特徴とする。

【0028】

【発明の実施の形態】以下に図面を参照して、この発明の好適な実施の形態を例示的に詳しく説明する。ただし、この実施の形態に記載されている構成部品の寸法、材質、形状、その相対配置などは、特に特定の記載がない限りは、この発明の範囲をそれらだけに限定する趣旨のものではない。

【0029】(第1の実施の形態)図1、図3～図11及び図13を参照して、本発明の第1の実施の形態に係るシート材処理装置及び画像形成装置について説明する。

【0030】なお、本実施の形態の説明では、シート材処理装置が独立の装置として、画像形成装置に対して着脱自在に構成された、オプション的な装置である場合を例に説明する。ただし、本発明のシート材処理装置は、画像形成装置に一体的に備えられる場合にも適用されることは言うまでもないが、以下に説明するシート材処理装置の場合と、機能的に異なることは特にないので、その説明は省略する。

【0031】図1は、画像形成装置に対してシート材処理装置が装着された状態を示す模式的断面図である。なお、図示の例においては、画像形成装置は複写機であり、シート材処理装置はフィニッシャーである。

【0032】まず、画像形成装置本体について説明する。

【0033】(画像形成装置)画像形成装置本体1には、原稿送り装置2が装着されている。

【0034】原稿は、原稿載置部3に載置されて給送部4により1枚づつ順次分離して供給される。続いて、レジストローラ対5によって一旦停止され、ループを形成することにより斜行が矯正される。その後、導入パス6を通り、読取位置7を通過することで、原稿表面に形成された画像が読み取られる。読取位置7を通過した原稿は、排出パス8を通り、排出トレイ9上に排出される。

【0035】また、表裏両面を読み取る場合には、まず上記のように、表面の読み取りが読取位置7を通過することで行われ、その後、排出パス8を通り反転ローラ対10によって表裏反転した状態で、再度レジストローラ対5に送られる。

【0036】そして、表面読み取りと同様に、レジストローラ対5で斜行が矯正され、導入パス6を通り、読取位置7で表面(このときは裏面)に形成された画像が読み取られる。そして、排出パス8を通り、排出トレイ9

へ排出される。

【0037】一方、読取位置7を通過する原稿画像に対して、照明系11により光を照射することで得られる反射光を、ミラー12によって、光学素子13（CCDあるいは他の素子）に導き、画像データを得る。そして、この画像データに基づいたレーザー光を、感光体ドラム14に照射して潜像を形成する。

【0038】ただし、特に図示はしないが、上記ミラー12によって、反射光を直接感光体ドラム14に照射して潜像を形成するように構成することもできる。

【0039】感光体ドラム14に、形成された潜像は、さらに、図示しないトナー供給装置から供給されたトナーによってトナー像が形成される。

【0040】15は紙あるいは、プラスチックフィルム等の記録媒体を収容するカセットである。記録信号に応じてカセット15から記録媒体が感光体ドラム14と対向する位置まで供給され、転写装置16によって感光体ドラム14に形成されたトナー像が記録媒体上に転写される。そして、トナー像が転写された記録媒体は定着装置17に送られて定着される。

【0041】記録媒体の両面に画像を形成する場合には、定着装置17によって片面の画像が定着された記録媒体は、定着装置17の下流側に設けた両面バス18を通過して再び感光体ドラム14、転写装置16の間に送られ、裏面に対シート材ナー像が形成される。そして、定着装置17でトナー像が定着されて外部（フィニッシャー19側）に排出される。

【0042】（シート材処理装置）フィニッシャー19について図3を参照して説明する。図3はシート材処理装置（フィニッシャー）の模式的断面図である。

【0043】19はシート材処理装置としてのフィニッシャーであり、画像形成装置本体1に係合（装着）されて使用されるものである。

【0044】20は入口ガイド対であり、画像形成装置本体1の排紙ローラ対21から排出されたシート材を受け取り、フィニッシャー19に案内するものである。S1はシート材検知センサーであり、フィニッシャー19に進入してきたシート材を検出するものである。

【0045】22はシート材を挟持・搬送する、シート材送り込み手段としての入口搬送ローラ対であり、装置内部にシート材を送り込むものである。23a、23bは搬送ガイド対であり、入口搬送ローラ対22から搬送されたシート材をガイドするものであり、搬送通路を形成している。

【0046】また、搬送ガイド対23a、23bは後に詳しく説明するが、シート材を待機させるシート材積載機能も兼ねている。言い換えれば、搬送通路内に、シート材を複数枚保持可能なシート材保持部が設けられている。

【0047】24は、こちらも後に詳しく説明するが、

シート材もしくはシート材束を、搬送ガイド対23a、23bから第1シート材積載部としての後処理トレイ25に搬送する機能と、後処理トレイ25から第2シート材積載部としての積載トレイ26に搬送する機能とを有するシート材束搬送機構としての搬送ユニットである。

【0048】搬送ユニット24の近傍には、搬送ガイド対23a、23bから搬送されてきたシート材の後端を、確実に後処理トレイ25に設置させるための後端おとし38が設けられている。

【0049】また、搬送ガイド対23a、23bの内部において、入口搬送ローラ対22の近傍には、画像形成装置本体1から搬送されてくるシート材を、後処理トレイ25に搬送される前に搬送ガイド対23a、23bに待機させるために、シート材を挟持して保持するための、挟持部材としてのシート材保持アーム27が設けられている。

【0050】このシート材保持アーム27は、後端を案内する機能とシート材を保持する機能を兼ねており、揺動自在に制御される。

【0051】28は整合手段を構成する整合板であり、後処理トレイ25に排出されたシート材の両端をガイドして幅寄せ整合するものであり、排出されるシート材の搬送方向と直交する幅方向両側にそれぞれ配置されている。

【0052】29はストッパーであって、後処理トレイ25に排出され、引き込みローラ43で送り込まれるシート材の後端を受け止めるものである。

【0053】ここで、本実施の形態では、シート材の後処理機能（後処理手段）として、シート材束に針打ちを行うステイプラー機構（ステイプラー手段）の場合について説明する。

【0054】ただし、後処理機能としては、これに限定するのではなく、たとえば、シート材束にのり付けして製本する製本化機能（製本化手段）の場合や、シート材にパンチを施すパンチ機能（パンチ手段）等の後処理機構を適用することもできる。

【0055】本実施の形態におけるステイプラー機構においては、上ステイプラー32が備えられており、この上ステイプラー32には下ステイプラー31から打たれる針を折り曲げる折り曲げ部を有している。

【0056】下ステイプラー31は軸33を中心に揺動するように構成されており、上ステイプラー32は軸34を中心に揺動するように構成されている。

【0057】また、下ステイプラー31及び上ステイプラー32は、各々軸33、34をスラスト方向（シート材搬送方向と直交する幅方向）に移動可能に構成されている。

【0058】下ステイプラー31は、外周に螺旋状のネジ溝を有するスクリュ軸35と係合するネジ部を有し、スクリュ軸35の回転によってスラスト方向に移

動可能に構成されている。

【0059】上ステイプラー32は、外周に螺旋状のネジ溝を有するスクリュ軸36と係合するネジ部を有し、スクリュ軸36の回転によってスラスト方向に移動可能に構成されている。

【0060】なお、スクリュ軸35、36は、それぞれ図示しない駆動モータにギア等を介し接続され、駆動を与えられている。

【0061】26は後処理後のシート材またはシート材束、あるいは、後処理が不要な場合には後処理がなされないシート材を積載するための積載トレイであり、垂直方向に移動可能（昇降可能）に構成されている。

【0062】S2は紙面検知センサーであり、積載トレイ26上のシート材の最上面を検知するものである。

【0063】37は略垂直な面で構成された後端ガイドであり、垂直方向に移動する積載トレイ26上のシート材の後端をガイドするものである。

【0064】次に、フィニッシャー19の搬送ガイド対23a、23bの内部（搬送通路内部）における、シート材保持部、シート材を挟持・待機させるための、シート材待機機構の構成及びその際のシート材の搬送状態について、図4（a）（b）及び図5（c）（d）を用いて詳しく説明する。

【0065】まず、排出ローラ対21からシート材が搬送されてくる。シート材検知センサーS1がこのシート材を検知すると、M3モータを駆動し、入口搬送ローラ対22及びローラ24aを回転させて、シート材を下流方向に搬送する。ここで、ローラ24aはシート材の搬送方向を上流側と下流側に切り替えることのできるシート材搬送手段である。

【0066】シート材の後端が入口搬送ローラ対22を通過し、所定量「図4（b）のAポイント」搬送されると、M3モータの駆動を停止し、次にM3モータの駆動を逆転させ、今まで搬送していた搬送方向とは逆の方向（上流方向）にこのシート材を搬送する。

【0067】また、それと同時にバネ49により図4（a）実線位置に付勢しているシート材保持アーム27を、ソレノイド48に励磁をかけることで、図4（b）矢印上方向に（先端を開く方向に）揺動させる。

【0068】そして、スイッチバックしてくるシート材の後端（この場合は上流側先端）を、搬送ガイド対23のつき当て部23cまで送り込む。

【0069】そこで、ソレノイド48の励磁を解除し、図5中下方向にシート材保持アーム27をもどすことで、シート材を保持し、シート材を待機させることができる。

【0070】このようにして、入口搬送ローラ対22によるシート材の搬送面よりも重力方向の下方にシート材を保持することができる。

【0071】この時、保持されているシート材は、搬送

ガイド23a、23b及び、その下流の後処理トレイ25もしくはそこに積載されているシート材束上にそって、両方にまたがって積載される。

【0072】次に画像形成装置本体1から搬送されてくるシート材についても同様の動作を行っていくことで、複数枚のシート材を待機・積載する（本実施の形態では、3枚積載を行っている）ことが可能である。

【0073】ここで、図5（d）に示すように、すでに保持・待機しているシート材がある場合に、次に搬送ガイド対23a、23bにシート材を搬入させようとすると、搬送ユニット24のローラ24aは、シート材保持アーム27で保持している状態のシート材を引き抜こうとする方向に回転してしまう。従って、ローラ24aをスポンジローラとすることで、この引き抜こうとする搬送力を低減させている。ただし、ローラ24aはスポンジローラに限らず、低搬送部材（弾力性のある低摩擦部材）であれば良い。つまり、ローラ24aによってシート材を下流方向に搬送する搬送力よりもシート材保持アーム27によってシート材を挟持する力の方が大きくなるように設定している。

【0074】このようにすることによって、シート材をローラ24aに挟持させつつ、シート材を保持しておくことができる。従って、搬送通路の距離を短くしつつ、シート材を保持できるため、少ないスペースでシート材の待機を行うことができ、しかも、シート材の搬送を中断する必要もない。

【0075】次に、シート材もしくはシート材束を搬送ガイド対23から後処理トレイ25に搬送する機能と、後処理トレイ25から積載トレイ26に搬送する機能とを有する搬送ユニット24の構成及びその際のシート材搬送状態について、図6（a）（b）、図7（c）（d）、図8（e）（f）、図9及び図10（a）（b）を用いて詳しく説明する。

【0076】まず、後処理トレイ25には、針綴じをするために、シート材束が所望の規定枚数積載される（図6（a））。

【0077】そして、プロダクティビティを低下させないように、シート材の中断は行わない。すなわち、画像形成装置から搬送されてくるシート材を、上述のシート材待機機構により、搬送ガイド対23a、23b及び後処理トレイ25に積載されたシート材束上に積載させた状態で保持し、後処理トレイへの搬送を待機させる。

【0078】本実施の形態におけるシート材処理装置では、3枚のシート材を待機させておくことで、後処理トレイ25上に積載されているシート材束に対するステイプル動作を終えることができる。

【0079】3枚のシート材待機動作が終了すると、図9に示すM1モータの駆動が開始する。なお、図9は搬送ユニット24の駆動系斜視図である。

【0080】M1モータの駆動により、周知のバネクラ

ッチを利用した構成により、搬送ユニット24が軸24bを回転中心として図6(b)の矢印方向に倒れこむ。そして、それにとまって下降してくるスポンジローラ24dが、後処理トレイ25上に積載されているステイプル済みのシート材束と、その上に積載された待機シート材3枚上に当接される。

【0081】ただ、このとき、スポンジローラ24dは、シート材束を積載トレイ26に搬送する方向とは逆に回ってしまっているため、ここでM1モータの駆動を停止させる。

【0082】また、スポンジローラ24dは軸24cの円周表面上にカラーのように設けられているので、軸24cが回転しても、その駆動が、スポンジローラ24dに伝わる事が無いように構成されている。

【0083】次に、図10に示すように、搬送ユニット24を矢印方向に押し込む、押し込み機構39により、搬送ユニット24をスポンジローラ24dが後処理トレイ25上のシート材束に当接している以上に押し込む（スポンジ部が凹むように押し込む）ことで、軸24cに係合されており、スポンジローラ24dの径よりも径が小さいゴムローラ24gが、後処理トレイ25上のシート材束に当接できるようにする。

【0084】そこで、M2モータの駆動を開始し、ゴムローラ24gと、シート材束を介して対となるように設けられた軸24eに係合したゴムローラ24fを回転させ、シート材束を積載トレイ26方向に搬送させる。

【0085】ここで、押し込み機構39の構成は、搬送ユニット24に当接して押し込みを行う押し込みアーム40と、押し込みアーム40にバネを介し設けられ、昇降可能にスライドするスライド板41と、スライド板41に駆動を与えるモータと、その間に存在し、モータの駆動をスライド板41に伝達する伝達ギア42から構成されている。

【0086】以上により、後処理トレイ25上に積載されているステイプル済みのシート材束と、その上に積載された待機シート材3枚を、同時に同一方向の積載トレイ26方向へ搬送させることができる（図6(b)）。

【0087】ここで、図7に示すように、搬送ガイド対23a、23bのシート材突き当て面23cから、搬送ユニット24のローラ24aまでの距離をL1とし、後処理トレイ25のシート材後端ストッパー29のシート材当接面から搬送ユニット24のローラ24fまでの距離をL2とすると、L2<L1の関係をとるようにしている。

【0088】言い換えれば、後処理トレイ25に積載されるシート材の積載トレイ26側への突出量の方が、搬送ガイド対23a、23b内のシート材保持部に保持されるシート材の積載トレイ26側への突出量よりも大きくなるように設定されている。

【0089】これにより、後処理トレイ25に積載され

るシート材と、シート材保持部に保持されるシート材が搬送ユニット24によって、同時に搬送される場合には、前者の方が先行することになる。

【0090】従って、積載トレイ26方向へ搬送されている、ステイプル済みのシート材束と、その上に積載された待機シート材3枚のうち、ステイプル済みのシート材束の後端がローラ24fを抜け、積載トレイ26上に排出・積載されても、その上に積載された待機シート材3枚は、ローラ24aによって挟持されている状態を保つことができる（図7(c)）。

【0091】それによって、ステイプル済みのシート材束がローラ24fを抜ける瞬間、その束の厚み分、その上に積載された待機シート材3枚がローラ24f側に落ち込むことでの、整合ズレを防止することができる。

【0092】待機シート材3枚の後端がローラ24aを抜け、所定量搬送されると、M2モータの駆動が今までの積載トレイ26方向に搬送させる方向からステイプル処理の行われる後処理トレイ25方向に搬送させる方向に逆転駆動する（図7(d)）。

【0093】それと同時に、モータを逆転させることで、押し込み機構39による加圧状態を解除し、ゴムローラ24gのシート材上面への当接を解除し、スポンジローラ24dのみの当接に切り替える。

【0094】また、同時にM1モータの駆動を開始し、スポンジローラ24dを回転させる。そして、M3モータの駆動を利用した引き込みローラ43も利用し、待機シート材3枚を搬送させていく。

【0095】ここで、引き込みローラ43にはワンウェイクラッチが設けられており、シート材の待機動作を行うために、M3モータを逆転させてシート材を搬送ガイド対23a、23bの突き当て部23cまで送り込む際に、引き込みローラ43を逆転させないように構成している。これにより、後処理トレイ25上に積載されるシート材の整合性を乱すことを防止している。

【0096】後処理トレイ25上を搬送する待機シート材3枚が、ストッパー29に当接すると同時にM1モータを逆転させ、搬送ユニット24を矢印方向に持ち上げ、また、M2モータを止めて、待機シート材3枚の後処理トレイ25への搬送を終了する（図8(e)）。

【0097】その後、画像形成装置本体1から続いて搬送されてくるシート材に対しては、後処理トレイ25に針綴じされる所定枚数に達するまで、シート材待機機構によって待機・積載させることはない。従って、入口搬送ローラ対22及びローラ24aによってシート材を搬送し、このシート材の後端がローラ24aを抜け、所定量搬送されたら、M1モータの駆動を開始して、搬送ユニット24を矢印方向に倒れこませ、シート材上にローラ24dを当接させる（図8(f)）。

【0098】そのままM1モータを駆動することでローラ24dを回転させ、シート材を後処理トレイ25上に

沿って搬送し、このシート材をストッパー29に突き当てて積載させる。そして、M1モータを逆転させ、搬送ユニット24を所定の位置に戻す。以後、前述した動作を繰り返し、指定された束数になるまで作業を繰り返す。

【0099】ここで、搬送ガイド対23a、23b内部における、入口搬送ローラ対22、ローラ24a、及び引き込みローラ43の駆動伝達系について、図11を用いて説明する。図11は本実施の形態に係るシート材処理装置の駆動伝達系を示す模式図である。

【0100】駆動源となるM3モータの軸上にはプーリが係合されており、入口搬送ローラ対22の軸上に係合したギア及び段ギアa44、段ギアb45と張架する形で、ベルトT1が設けられている。

【0101】さらに、段ギアa44は、ローラ24aに設けられた軸24bに係合されたギアと接続し、段ギアb45は、ベルトT2を介し、段ギアc46、さらに、ベルトT3を介し、引き込みローラ43の軸上に係合されたギアに係合している。

【0102】これによって、M3モータが正転又は逆転駆動を行うと、それに伴って、入口搬送ローラ対22及びローラ24aが正転又は逆転方向に回転する。

【0103】また、引き込みローラ43は、ワンウェイクラッチが設けられているため、ストッパー29にシート材を引き込む方向にのみ回転可能となる。

【0104】また、フィニッシャー19内にある、シート材検知センサーS1及び紙面検知センサーS2は、装置全体の駆動を制御するCPUに接続されている。CPUは、各センサーからの検知信号に基づいて、前述した各モータを回転制御するとともに、各圧接ソレノイドの励磁制御を行うようになっている。

【0105】図13に前記CPUについての制御ブロック図を示す。

【0106】この制御ブロック図に示すように、CPUにはROMおよびRAMが接続されており、搬送系関連の各種部材、積載トレイ部の各種部材及び整合/ステイブル関連の各種部材の制御を行っている。

【0107】なお、上記搬送系関連の各種部材としては、図13に示すように、シート材検知センサーS1、搬送駆動モータM1、M2、M3、押し込み機構モータ、シート保持アームソレノイド及び搬送コロソレノイド等がある。

【0108】また、上記積載トレイ部の各種部材としては、紙面検知センサーS2、トレイ昇降モータ、昇降クロックセンサー、上段スイッチ及び下段スイッチ等がある。

【0109】また、上記整合/ステイブル関連の各種部材としては、整合HPセンサー、整合モータ、ステイブルHPセンサー及びステイブルモータ等がある。

【0110】次に、各処理モード選択時における上記構

成のフィニッシャーの動作について説明する。

【0111】(スタックモード選択時)まず、スタックモード選択時のフィニッシャーの動作について説明する。

【0112】画像形成装置本体1の排紙ローラ対21から排出されたシート材が、シート材検知センサーS1により検知されると、M3モータが駆動を始め、入口搬送ローラ対22、及び、ローラ24aが回転する。

【0113】少なくともシート材の後端がローラ24aのニップを抜ける分以上、M3モータを回転させる。

【0114】これにより、シート材が後処理トレイ25上に排出される。

【0115】そして、M1モータが駆動を開始し、搬送ユニット24を後処理トレイ25方向へ倒しこみ、後処理トレイ25上に排出されたシート材上にローラ24dを当接させる。

【0116】そのままM1モータを駆動することでスポンジローラ24dを回転させ、シート材を後処理トレイ25上に沿って搬送し、ストッパー29に突き当たったところで、M1モータの駆動を停止させ、積載させる。そして、M1モータを逆転させ、搬送ユニット24を所定の位置に戻す。

【0117】次に整合モータ(不図示)を回転させ、整合板28をシート材搬送方向と直交する幅方向に移動させて、後処理トレイ25上のシート材両端に当てて、整合を行う。これを所定枚数回、繰り返す。

【0118】所定枚数のシート材束となったなら、M1モータを駆動させ、搬送ユニット24を後処理トレイ25方向へ倒しこみ、シート材束上にスポンジローラ24dを当接させる。そして、M1モータを停止させ、押し込み機構39により、搬送ユニット24をスポンジローラ24dが後処理トレイ25上のシート材束に当接している以上に押し込む(スポンジ部が凹むように押し込む)ことで、軸24cに係合されており、スポンジローラ24dの径よりも径が小さいゴムローラ24gが、後処理トレイ25上のシート材束に当接できるようにする。

【0119】そこで、M2モータの駆動を開始し、ゴムローラ24gと、シート材束を介して対となるように設けられた、軸24eに係合したゴムローラ24fを回転させ、シート材束を積載トレイ26方向に搬送し、積載させる。

【0120】そして、トレイシフトモータ(不図示)を回転させて所定量、積載トレイ26を下降させ、その後、トレイシフトモータを逆転させて積載トレイ26を上昇させる。この時、紙面検知センサーS2で積載シート材上面(最上面)を検知したら、トレイシフトモータの駆動を停止する。

【0121】(ステイブルモード選択時)次にステイブルモード選択時のフィニッシャーの動作について説明す

る。

【0122】尚、後処理トレイ25上へ所望枚数のシート材を排出し、積載し、整合するシーケンスは、前述のスタックモードと同一のシーケンスなので、ここではその説明を省略する。

【0123】整合終了後、下ステイプラー31及び上ステイプラー32によって後処理トレイ25上のシート材の端部に一箇所以上の綴じ処理を行う。綴じ処理が終了した後、先にも述べたスタックモードと同様なシーケンスで、積載トレイ26上にシート材を移送し、積載する。

【0124】(多数束作成のステイプルモード選択時)次に、本実施の形態の特徴である多数束作成のステイプルモード選択時におけるフィニッシャー19の動作について説明する。

【0125】先ず前述のスタックモードと同様に、後処理トレイ25上にシート材を積載し、整合する。

【0126】この動作を所定の枚数になるまで繰り返す。

【0127】そのあと、フィニッシャー19では、ステイプルによる針綴じ動作にはいっていき、画像形成装置本体1の排紙ローラ対21からは中断することなくシート材が搬送されてくる。そして、後処理トレイ25ではステイプル動作を行いつつ、シート材がシート材検知センサーS1により検知されると、M3モータが駆動を始め、入口搬送ローラ対22、及び、ローラ24aが回転し、シート材を搬送する。

【0128】シート材検知センサーS1によりシート材後端を検知し、シート材の後端が図4のAポイントの位置まで搬送されると、今まで搬送していた搬送方向とは逆の方向にシート材を搬送し、またそれと同時に、バネにより付勢しているシート材保持アーム27をソレノイドに励磁をかけることで、先端が開く方向に揺動させる。

【0129】そして、反転してくるシート材の後端(この場合は搬送方向の先端)を、搬送ガイド対23のつき当て部23cまで送り込む。そして、ソレノイドの励磁を解除し、シート材保持アーム27をもどす(先端を閉じる)ことで、シート材を保持し、待機させることができる。

【0130】この時、保持されているシート材は搬送ガイド23及び、その下流の後処理トレイ25上に積載されているシート材束上にまたがって積載されている。

【0131】次に画像形成装置本体1から搬送されてくるシート材についても同様の動作を行い、3枚のシート材を待機・積載する。

【0132】ここで、上述のステイプラーによる針綴じ処理を行っていた後処理トレイ25上に積載されているシート材束は、その処理を終えているので、M1モータの駆動を開始し、搬送ユニット24を後処理トレイ25

方向へ倒しこみ、後処理トレイ25上に積載されているステイプル済みのシート材束と、その上に積載された待機シート材3枚上にローラ24dを当接させる。

【0133】そして、M1モータを停止させ、押し込み機構39により、搬送ユニット24を、スポンジローラ24dが後処理トレイ25上のシート材束に当接している以上に押し込む(スポンジ部が凹むように押し込む)ことで、軸24cに係合されており、スポンジローラ24dの径よりも小さいゴムローラ24gが、後処理トレイ25上のシート材束に当接できるようにする。

【0134】そして、M2モータの駆動を開始し、ゴムローラ24gと、シート材束を介して対となるように設けられた、軸24eに係合したゴムローラ24fを回転させ、後処理トレイ25上に積載されているステイプル済みのシート材束と、その上に積載された待機シート材3枚を同時に、同一方向の積載トレイ26方向へ搬送させる。

【0135】前述したように、後処理トレイ25上に積載されているステイプル済みのシート材束と、その上に積載された待機シート材3枚のそれぞれの後端をずらして搬送させることで、ステイプル済みのシート材束の後端がローラ24fを抜け、積載トレイ26に排紙・積載されても、その上に積載された待機シート材3枚は、ローラ24aによって挟持されている状態を維持できる。

【0136】ここで、積載トレイ26に排出・積載されたシート材束の処理のため、トレイシフトモータ(不図示)を回転させて、所定量だけ積載トレイ26を下降させ、その後、トレイシフトモータを逆転させて積載トレイ26を上昇させる。

【0137】この時、紙面検知センサーS2で積載シート材上面(最上面)を検知したら、トレイシフトモータの駆動を停止する。

【0138】一方、待機シート材3枚の後端がローラ24aを抜け、所定量搬送されると、M2モータの駆動が今までの積載トレイ26方向に搬送させる方向から、ステイプル処理の行われる後処理トレイ方向に搬送させる方向に逆転駆動する。

【0139】それと同時に、押し込み機構39を駆動するモータを逆転させることで、加圧状態を解除し、ゴムローラ24gのシート材上面への当接を解除し、スポンジローラ24dのみの当接に切り替える。

【0140】また、同時にM1モータの駆動を開始し、スポンジローラ24dを回転させる。そして、M3モータの駆動を利用した引き込みローラ43も利用し、待機シート材3枚を搬送させていく。

【0141】後処理トレイ25上を搬送する待機シート材3枚が、ストッパー29に当接すると同時にM1モータを逆転させ、搬送ユニット24を持ち上げ、また、M2モータを止めて、待機シート材3枚の後処理トレイ25への搬送を終了する。

【0142】次に整合モータ（不図示）を回転させ、整合板28をシート材搬送方向と直交する幅方向に移動させて後処理トレイ25上のシート材両端に当てて、整合を行う。

【0143】その後、画像形成装置本体1から続いて搬送されてくるシート材に対しては、後処理トレイ25に針綴じされる所定枚数に達するまでは、シート材待機機構によって待機・積載させる必要はない。従って、入口搬送ローラ対22及びローラ24aによって、シート材を搬送し、このシート材の後端がローラ24aを抜けて、所定量搬送されたら、M1モータの駆動を開始し、搬送ユニット24を後処理トレイ25方向に倒れこませ、シート材上にローラ24dを当接させる。

【0144】そのままM1モータを駆動することでローラ24dを回転させ、シート材を後処理トレイ25上に沿って搬送し、ストッパー29に突き当て積載させる。同時にM1モータを逆転させ、搬送ユニット24を持ち上げる。

【0145】次に、整合モータ（不図示）を回転させ、整合板28をシート材搬送方向と直交する幅方向に移動させて、後処理トレイ25上のシート材両端に当てて、整合を行う。

【0146】このようにして、指定された束数になるまで前記動作を繰り返す。

【0147】そして、ステイブル処理を行う指定の枚数までためられたら、以後は、同モードの最初に書かれたシーケンスにそって同様の動作を繰り返し、希望したステイブル済みの束数が作成されるまで続けられる。

【0148】上述したように、本実施の形態においては、搬送パス内部にシート材保持機構を設けたので、シート材を待機させるための専用のパス（上述したバッファローラパスなど）を設ける必要がない。

【0149】また、待機させるシート材を現存の搬送パス及び、その下流にある後処理トレイ上に積載されたシート材束上にまたがって積載・保持させることによって、シート材を保持するスペースをほとんど既存の部分を利用するようにした。

【0150】従って、シート材の搬送を中断させる必要もないことから、プロダクティビティーの低下を防止しつつ、省スペースで、低コストな装置を提供することが可能である。

【0151】また、搬送パスの下流に設けられた搬送機構によって、シート材保持機構により待機しているシート材と、後処理トレイに積載しているシート材束を、同時に同一方向に搬送させ、かつそれぞれのシート材またはシート材束の搬送方向に対しての後端位置をずらした状態となるように搬送させるようにした。これにより、通常、後処理トレイ上のシート材束の退避を終了した後、次に後処理を行うためにシート材保持機構により待機していたシート材を搬送するという、この一連の動作

でかかる時間を短縮し、生産性の向上（プロダクティビティーの向上）につながる装置を提供することも可能である。

【0152】（第2の実施の形態）図12には、第2の実施の形態が示されている。上記第1の実施の形態では、シート材待機機構におけるシート材保持手段（挟持手段）として、図4（a）等に応示するようなアーム状の部材を用いる場合を示したが、本実施の形態では、挟持手段としてスポンジローラ47を用いる場合を説明する。

【0153】その他の構成および作用については第1の実施の形態と同一なので、同一の構成部分については同一の符号を付して、その説明は省略する。

【0154】図12は本発明の第2の実施の形態に係るシート材処理装置の主要部の模式的断面図である。

【0155】本実施の形態では、搬送通路内にスポンジローラ47を設けて、このスポンジローラ47によってシート材を挟持して、保持するように構成した。

【0156】すなわち、本実施の形態においては、シート材の後端が図4（b）のAポイントの位置まで搬送されると、搬送方向を逆転させ、シート材を図中矢印方向に回転しているスポンジローラ47に巻きこんで押さえ込ませて、シート材保持・積載させるように構成されている。

【0157】ここで、すでに保持・待機しているシート材がある場合、次に搬送ガイド対23にシート材を搬入させようとする、搬送ユニット24のローラ24aは、スポンジローラ47で保持している状態のシート材を引き抜こうとする方向に回転する。

【0158】従って、スポンジローラ47には、ある程度の付勢力を与えるバネを設けて、ローラ24aの引き抜き力よりもスポンジローラ47の保持力の方が大きくなるような関係を保てるように構成されている。

【0159】これにより、上記実施の形態の場合と同様に、省スペースで、複数のシート材を保持できる。

【0160】（その他の実施の形態）前述した実施の形態では、画像形成装置として複写機を例示したが、本発明はこれに限定するものではなく、例えば、プリンタ、ファクシミリ等の他の画像形成装置であっても良い。いずれの画像形成装置の場合であっても、上記本実施の形態に係るシート材処理装置を適用することにより同様の効果を得ることができる。

【0161】また、上記の通り、これまでの説明では画像形成装置に対して着脱自在なシート材処理装置を例示したが、画像形成装置内に一体的に有するシート材処理装置の場合でも同様に適用するができ、同様の効果を得ることができる。

【0162】また、上述した画像形成装置における記録方式として電子写真方式の場合を例示したが、これに限定されるものではなく、例えば、インクジェット方式等の他の記録方式を採用することができる。

【0163】また、上述のように、シート材処理装置のフィニッシャーの内部において、後処理手段として、シート材束を作成するステイプラー手段を例示したが、これに限定されるものではなく、例えば、のりづけ製本機構等のシート材束作成手段を適用することもできる。

【0164】

【発明の効果】以上説明したように、本発明は、搬送通路内に、シート材を複数枚保持可能なシート材保持部を設けたので、シート材を待機させるための専用のバス等を設ける必要がなく、かつ、シート材の搬送を中断する必要がないので、プロダクティビティの向上を図りつつ、省スペースかつ低コストを実現できる。

【0165】また、シート材保持部でシート材を保持する場合には、シート材の先端がシート材搬送手段を越えた状態でシート材を保持するようにすることで、シート材を保持するためのスペースは狭くて済む。

【0166】また、シート材束搬送機構が第1シート材積載部に積載されたシート材束とシート材保持部に保持されたシート材を同時に搬送可能に設けられ、これらを同時に搬送する場合には、第1シート材積載部に積載されたシート材束の方がシート材保持部に保持されたシート材よりも先行するように搬送し、シート材束を第2積載部に積載させた後に、シート材保持部に保持されていたシート材を第1シート材積載部に搬送するように、シート材束搬送機構が制御されることで、後処理後のシート束を排出するための動作と、次ぎの後処理動作の開始を同時に行うため、生産性が向上する。

【図面の簡単な説明】

【図1】画像形成装置に対してシート材処理装置が装着された状態を示す模式的断面図（主断面図）である。

【図2】従来技術に係るシート材処理装置の模式的断面図（主断面図）である。

【図3】シート材処理装置の模式的断面図である。

【図4】シート材を待機させるための機構及び動作説明図である。

【図5】シート材を待機させるための機構及び動作説明図である。

【図6】本発明の実施の形態に係るシート材処理装置における搬送ユニットの機構及び動作説明図である。

【図7】本発明の実施の形態に係るシート材処理装置における搬送ユニットの機構及び動作説明図である。

【図8】本発明の実施の形態に係るシート材処理装置における搬送ユニットの機構及び動作説明図である。

【図9】本発明の実施の形態に係るシート材処理装置における搬送ユニットの駆動伝達機構の斜視図である。

【図10】本発明の実施の形態に係るシート材処理装置における搬送ユニットの押し込み機構の動作説明図である。

【図11】本発明の実施の形態に係るシート材処理装置の駆動伝達系を示す模式図である。

【図12】本発明の第2の実施の形態に係るシート材処理装置の主要部の模式的断面図である。

【図13】本発明の実施の形態に係るシート材処理装置の制御ブロック図である。

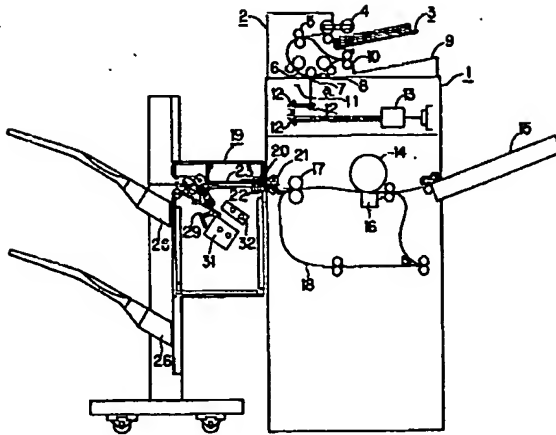
【符号の説明】

- 1 画像形成装置本体
- 2 原稿送り装置
- 3 原稿載置部
- 4 給送部
- 5 レジストローラ対
- 6 導入バス
- 7 読取位置
- 8 排出バス
- 9 排出トレイ
- 10 反転ローラ対
- 11 照明系
- 12 ミラー
- 13 光学素子
- 14 感光体ドラム
- 15 カセット
- 16 転写装置
- 17 定着装置
- 18 両面バス
- 19 フィニッシャー
- 20 入口ガイド対
- 21 排紙ローラ対
- 22 入口搬送ローラ対
- 23 a, 23 b 搬送ガイド対
- 24 搬送ユニット
- 25 後処理トレイ
- 26 積載トレイ
- 27 シート材保持アーム
- 28 整合板
- 29 ストッパー
- 31 下ステイプラー
- 32 上ステイプラー
- 33 軸
- 34 軸
- 35 スクリュー軸
- 36 スクリュー軸
- 37 後端ガイド
- 38 後端おとし
- 39 押し込み機構
- 40 押し込みアーム
- 41 スライド板
- 42 伝達ギア
- 43 引き込みローラ
- 44 段ギアa
- 45 段ギアb
- 46 段ギアc

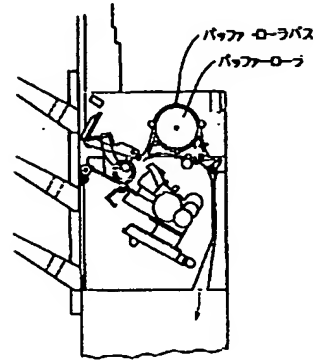
47 スポンジローラ
S1 シート材検知センサー

S2 紙面検知センサー

【図1】

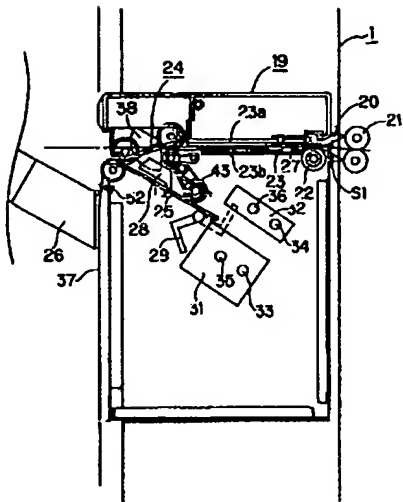


【図2】

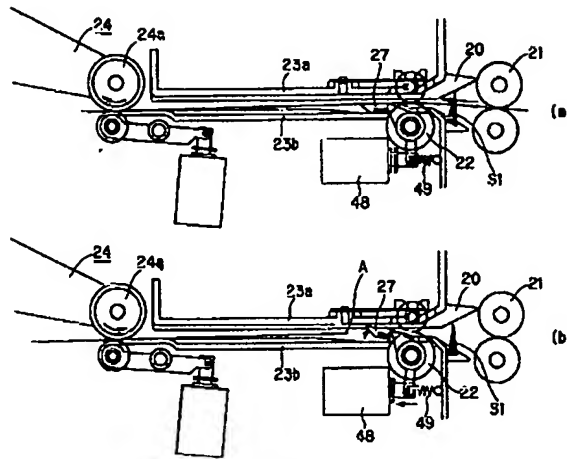


(従来のシート材処理装置)

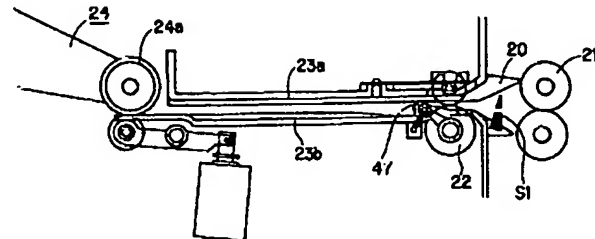
【図3】



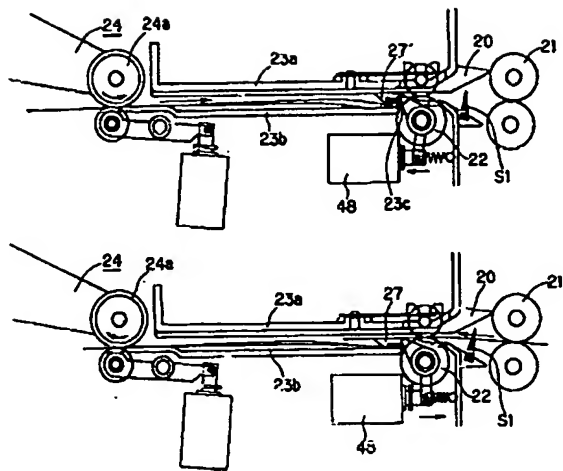
【図4】



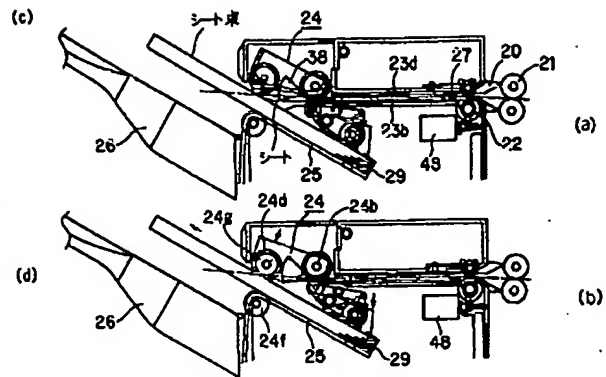
【図12】



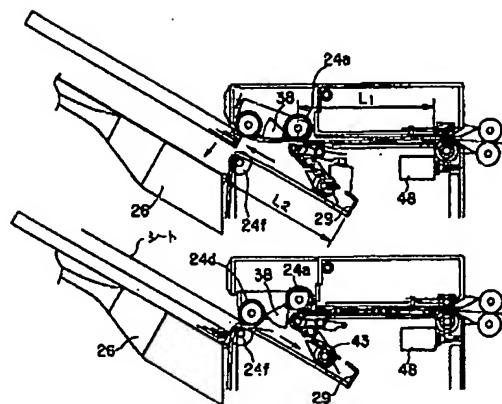
【図5】



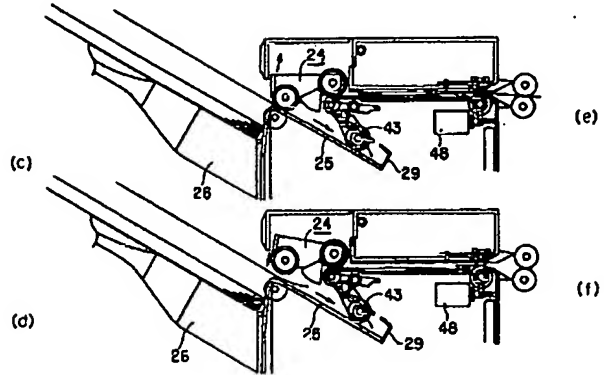
【図6】



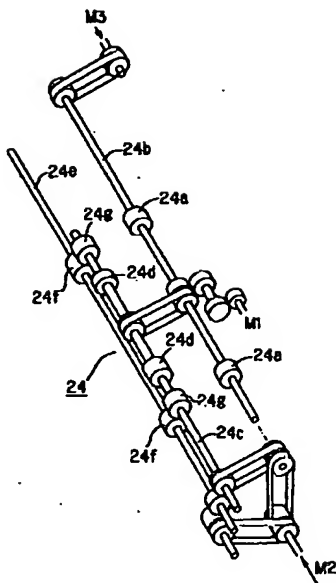
【図7】



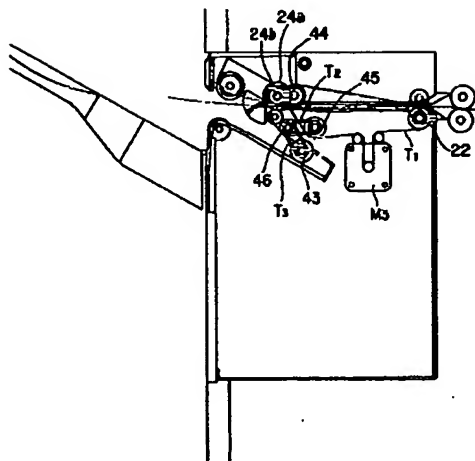
【図8】



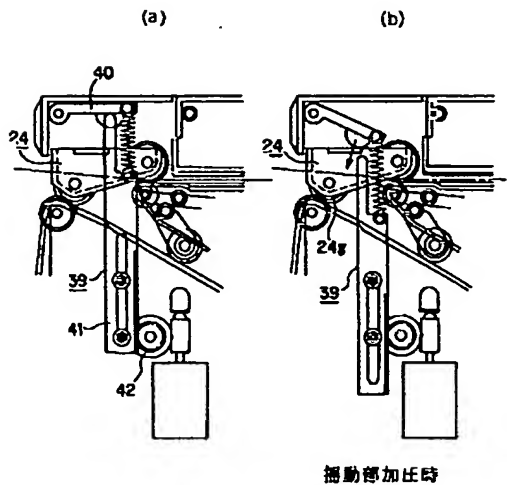
【図9】



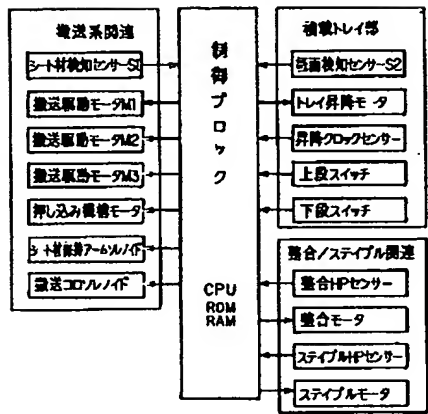
【図11】



【図10】



【図13】



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EA17 EA19
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HA32